

Legend: (Proposed Amendment(s))

Single Underline = Proposed new language

**[Bold, Print, and Brackets]** = Current language proposed for deletion

Regular Print = Current language

(No change.) = No changes are being considered for the designated subdivision

## §289.257. Packaging and Transportation of Radioactive Material.

### (a) Purpose.

#### (1) (No change.)

(2) The packaging and transport of radioactive material are also subject to the requirements of §289.201 of this title (relating to General Provisions for Radioactive Material), §289.202 of this title (relating to Standards for Protection Against Radiation from Radioactive Materials), §289.203 of this title (relating to Notices, Instructions, and Reports to Workers; Inspections), §289.204 of this title (relating to Fees for Certificates of Registration, Radioactive Material Licenses, Emergency Planning and Implementation, and Other Regulatory Services), §289.205 of this title (relating to Hearing and Enforcement Procedures), §289.251 of this title (relating to Exemptions, General Licenses, and General License Acknowledgements), §289.252 of this title (relating to Licensing of Radioactive Material), and **[§289.254 of this title (relating to Licensing of Radioactive Waste Processing and Storage Facilities),]** §289.256 of this title (relating to Medical and Veterinary Use of Radioactive Material), and **[§289.260 of this title (relating to Licensing of Uranium Recovery and Byproduct Material Disposal Facilities)]** and to the regulations of other agencies (e.g., the United States Department of Transportation (DOT) and the United States Postal Service) having jurisdiction over means of transport. The requirements of this section are in addition to, and not in substitution for, other requirements.

#### (b) - (c) (No change.)

(d) Definitions. The following words and terms when used in this section shall have the following meaning, unless the context clearly indicates otherwise. To ensure compatibility with international transportation standards, all limits in this section are given in terms of dual units: The International System of Units (SI) followed or preceded by United States (U.S.) standard or customary units. The U.S. customary units are not exact equivalents, but are rounded to a convenient value, providing a functionally equivalent unit. For the purpose of this section, SI units shall be used.

(1)  $A_1$  -- The maximum activity of special form radioactive material permitted in a Type A package. This value is either listed in Table 257-3 of subsection (ee)(6) **[(ff)(6)]** of this section, or may be derived in accordance with the procedure prescribed in subsection (ee) **[(ff)]** of this section.

(2)  $A_2$  -- The maximum activity of radioactive material, other than special form, low specific activity (LSA) and surface contaminated object (SCO) material, permitted in a Type A package. This value is either listed in Table 257-3 of subsection (ee)(6) **[(ff)(6)]** of this

section, or may be derived in accordance with the procedure prescribed in subsection (ee) [(ff)] of this section.

**[(3) BRC Forms 540, 540A, 541, 541A, 542, and 542A--Official agency forms referenced in subsection (gg) of this section which includes the information required by DOT in Title 49, Code of Federal Regulations (CFR), Part 172. BRC Form 541B contains additional information for low-level radioactive waste (LLRW) shipments to a Texas LLRW disposal facility. Licensees need not use originals of these forms as long as any substitute forms are equivalent to the original documentation in respect to content, clarity, size, and location of information. Upon agreement between the shipper and consignee, BRC Forms 541 (and 541A and 541B) and BRC Forms 542 (and 542A) may be completed, transmitted, and stored in electronic media. The electronic media shall have the capability for producing legible, accurate, and complete records in the format of the uniform manifest.]**

(3) [(4)] Carrier--A person engaged in the transportation of passengers or property by land or water as a common, contract, or private carrier, or by civil aircraft.

(4) [(5)] Certificate holder--A person who has been issued a certificate of compliance or other package approval by the agency.

(5) [(6)] Certificate of compliance--The certificate issued by the NRC that approves the design of a package for the transportation of radioactive materials.

(6) [(7)] Chelating agent--Amine polycarboxylic acids (e.g., EDTA, DTPA), hydroxy-carboxylic acids, and polycarboxylic acids (e.g., citric acid, carbolic acid, and glucinic acid).

(7) [(8)] Chemical description--A description of the principal chemical characteristics of a LLRW.

(8) [(9)] Consignee--The designated receiver of the shipment of low-level radioactive waste.

(9) [(10)] Consignment--Each shipment of a package or groups of packages or load of radioactive material offered by a shipper for transport.

(10) [(11)] Containment system--The assembly of components of the packaging intended to retain the radioactive material during transport.

(11) [(12)] Conveyance--For transport on:

(A) public highway or rail by transport vehicle or large freight container;

(B) water by vessel, or any hold, compartment, or defined deck area of a vessel including any transport vehicle on board the vessel; and

(C) aircraft.

(12) [(13)] Criticality Safety Index (CSI)--The dimensionless number (rounded up to the next tenth) assigned to and placed on the label of a fissile material package, to designate the degree of control of accumulation of packages containing fissile material during transportation. Determination of the criticality safety index is described in subsection (i) of this section and Title 10, Code of Federal Regulations (CFR) [CFR], §71.59.

(13) [(14)] Decontamination facility--A facility operating in accordance with an NRC, agreement state, or agency license whose principal purpose is decontamination of equipment or materials to accomplish recycle, reuse, or other waste management objectives, and, for purposes of this section, is not considered to be a consignee for LLRW shipments.

(14) [(15)] Deuterium--For the purposes of this section, this means deuterium and any deuterium compound, including heavy water, in which the ratio of deuterium atoms to hydrogen atoms exceeds 1:5000.

(15) [(16)] Disposal container--A transport container principally used to confine LLRW during disposal operations at a land disposal facility (also see definition for high integrity container). Note that for some shipments, the disposal container may be the transport package.

(16) [(17)] Environmental Protection Agency (EPA) identification number--The number received by a transporter following application to the administrator of EPA as required by Title 40, CFR, Part 263.

(17) [(18)] Exclusive use--The sole use by a single consignor of a conveyance for which all initial, intermediate, and final loading and unloading are carried out in accordance with the direction of the consignor or consignee. The consignor and the carrier shall ensure that any loading or unloading is performed by personnel having radiological training and resources appropriate for safe handling of the consignment. The consignor shall issue specific instructions, in writing, for maintenance of exclusive use shipment controls, and include them with the shipping paper information provided to the carrier by the consignor.

(18) [(19)] Fissile material--The radionuclides plutonium-239, plutonium-241, uranium-233, uranium-235, or any combination of these radionuclides. Fissile material means the fissile nuclides themselves, not material containing fissile nuclides. Unirradiated natural uranium and depleted uranium, and natural uranium or depleted uranium that has been irradiated in thermal reactors only are not included in this definition. Agency jurisdiction extends only to special nuclear material in quantities not sufficient to form a "critical mass" as defined in §289.201(b) of this title. Certain exclusions from fissile material controls are provided in subsection (h) of this section.

(19) [(20)] Generator--A licensee operating in accordance with an NRC, agreement state, or agency license who:

(A) is a waste generator as defined in this section; or

(B) is the licensee to whom waste can be attributed within the context of the Low-Level Radioactive Waste Policy Amendments Act of 1985 (e.g., waste generated as a result of decontamination or recycle activities).

(20) [(21)] Graphite--For the purposes of this section, this means graphite with a boron equivalent content of less than five parts per million and density greater than 1.5 grams per cubic centimeter.

(21) [(22)] High integrity container (HIC)--A container commonly designed to meet the structural stability requirements of Title 10, CFR, §61.56, and to meet DOT requirements for a Type A package.

(22) [(23)] Industrial package (IP)--A packaging that, together with its low specific activity (LSA) material or surface contaminated object (SCO) contents, meets the requirements of Title 49, CFR, §173.410 and §173.411. Industrial packages are categorized in Title 49, CFR, §173.411 as either:

(A) Industrial package Type 1 (IP-1);

(B) Industrial package Type 2 (IP-2); or

(C) Industrial package Type 3 (IP-3).

(23) [(24)] Low-level radioactive waste (LLRW)--Radioactive material that meets the following criteria:

(A) LLRW is radioactive material that is:

(i) discarded or unwanted and is not exempt by rule adopted in accordance with the Texas Radiation Control Act (Act), Health and Safety Code, §401.106;

(ii) waste, as that term is defined in Title 10, CFR, §61.2; and

(iii) subject to:

(I) concentration limits established in Title 10, CFR, §61.55, or compatible rules adopted by the agency or the Texas Commission on Environmental Quality (TCEQ), as applicable; and

(II) disposal criteria established in Title 10, CFR, or established by the agency or TCEQ, as applicable.

(B) LLRW does not include:

(i) high-level radioactive waste as defined in Title 10, CFR, §60.2;

- (ii) spent nuclear fuel as defined in Title 10, CFR, §72.3;
- (iii) byproduct material defined in the Act, Health and Safety Code, §401.003(3)(B);
- (iv) naturally occurring radioactive material (NORM) waste that is not oil and gas NORM waste;
- (v) oil and gas NORM waste; or
- (vi) transuranics greater than 100 nanocuries per gram.

(24) [(25)] Low specific activity (LSA) material--Radioactive material with limited specific activity which is nonfissile or is excepted in accordance with subsection (h) of this section, and which satisfies the following descriptions and limits set forth. Shielding materials surrounding the LSA material may not be considered in determining the estimated average specific activity of the package contents. LSA material shall be in one of the following three groups:

(A) LSA-I.

(i) Ores containing only naturally occurring radionuclides (e.g., uranium, thorium) and uranium or thorium concentrates of such ores which are not intended to be processed for the use of these radionuclides; or

(ii) Solid unirradiated natural uranium or depleted uranium or natural thorium or their solid or liquid compounds or mixtures; or

(iii) Radioactive material for which the  $A_2$  value is unlimited; or

(iv) Other radioactive material (e.g.: mill tailings, contaminated earth, concrete, rubble, other debris, and activated material) in which the radioactivity is distributed throughout, and the estimated average specific activity does not exceed 30 times the value for exempt material activity concentration determined in accordance with subsection (ee) [(ff)] of this section.

(B) LSA-II.

(i) Water with tritium concentration up to 0.8 terabecquerel per liter (TBq/l) (20.0 curies per liter (Ci/l)); or

(ii) Other material in which the radioactivity is distributed throughout, and the average specific activity does not exceed  $10^{-4}$   $A_2$ /g for solids and gases, and  $10^{-5}$   $A_2$ /g for liquids.

(C) LSA-III. Solids (e.g., consolidated wastes, activated materials), excluding powders, that satisfy the requirements of Title 10, CFR, §71.77 in which:

(i) the radioactive material is distributed throughout a solid or a collection of solid objects, or is essentially uniformly distributed in a solid compact binding agent (such as concrete, bitumen, ceramic, etc.); and

(ii) the radioactive material is relatively insoluble, or it is intrinsically contained in a relatively insoluble material, so that, even with a loss of packaging, the loss of radioactive material per package by leaching, when placed in water for seven days, would not exceed  $0.1 A_2$ ; and

(iii) the average specific activity of the solid does not exceed  $2 \times 10^{-3} A_2/\text{g}$ .

(25) [(26)] Low toxicity alpha emitters--Natural uranium, depleted uranium, natural thorium; uranium-235, uranium-238, thorium-232, thorium-228 or thorium-230 when contained in ores or physical or chemical concentrates or tailings; or alpha emitters with a half-life of less than ten days.

(26) [(27)] Maximum normal operating pressure--The maximum gauge pressure that would develop in the containment system in a period of one year under the heat condition specified in Title 10, CFR, §71.71(c)(1), in the absence of venting, external cooling by an ancillary system, or operational controls during transport.

(27) [(28)] Natural thorium--Thorium with the naturally occurring distribution of thorium isotopes (essentially 100 weight percent thorium-232).

(28) [(29)] Normal form radioactive material--Radioactive material that has not been demonstrated to qualify as special form radioactive material.

(29) [(30)] Package--The packaging together with its radioactive contents as presented for transport.

(A) Fissile material package, Type AF package, Type BF package, Type B(U)F package, or Type B(M)F package--A fissile material packaging together with its fissile material contents.

(B) Type A package--A Type A packaging together with its radioactive contents. A Type A package is defined and shall comply with the DOT regulations in Title 49, CFR, Part 173.

(C) Type B package--A Type B packaging together with its radioactive contents. On approval by the NRC, a Type B package design is designated by NRC as B(U) unless the package has a maximum normal operating pressure of more than 700 kilopascals (kPa) (100 pounds per square inch ( $\text{lb}/\text{in}^2$ )) gauge or a pressure relief device that would allow the

release of radioactive material to the environment under the tests specified in Title 10, CFR, §71.73 (hypothetical accident conditions), in which case it will receive a designation B(M). B(U) refers to the need for unilateral approval of international shipments; B(M) refers to the need for multilateral approval of international shipments. There is no distinction made in how packages with these designations may be used in domestic transportation. To determine their distinction for international transportation, see DOT regulations in Title 49, CFR, Part 173. A Type B package approved before September 6, 1983, was designated only as Type B. Limitations on its use are specified in Title 10, CFR, §71.19.

(30) [(31)] Packaging--The assembly of components necessary to ensure compliance with the packaging requirements of this section. It may consist of one or more receptacles, absorbent materials, spacing structures, thermal insulation, radiation shielding, and devices for cooling or absorbing mechanical shocks. The vehicle, tie-down system, and auxiliary equipment may be designated as part of the packaging.

(31) [(32)] Physical description--The items called for on RC Form [BRC Form] 541 to describe a LLRW.

(32) RC Forms 540, 540A, 541, 541A, 542, and 542A--Official agency forms referenced in subsection (ff) of this section which includes the information required by DOT in Title 49, Code of Federal Regulations, Part 172. RC Form 541B contains additional information for LLRW shipments to a Texas LLRW disposal facility. Licensees need not use originals of these forms as long as any substitute forms are equivalent to the original documentation in respect to content, clarity, size, and location of information. Upon agreement between the shipper and consignee, RC Forms 541 (and 541A and 541B) and RC Forms 542 (and 542A) may be completed, transmitted, and stored in electronic media. The electronic media shall have the capability for producing legible, accurate, and complete records in the format of the uniform manifest.

(33) - (37) (No change.)

(38) Surface contaminated object (SCO)--A solid object that is not itself classed as radioactive material, but which has radioactive material distributed on any of its surfaces. A SCO shall be in one of the following two groups with surface activity not exceeding the following limits:

(A) SCO-I--A solid object on which:

(i) (No change.)

(ii) the fixed contamination on the accessible surface averaged over  $300 \text{ cm}^2$  (or the area of the surface if less than  $300 \text{ cm}^2$ ) does not exceed  $4 \times 10^4 \text{ Bq/cm}^2$  ( $1 \text{ } \mu\text{Ci/cm}^2$ ) for beta and gamma and low toxicity alpha emitters, or  $4 \times 10^3 \text{ Bq/cm}^2$  ( $10^{-2} \text{ } \mu\text{Ci/cm}^2$ ) [(10<sup>-1</sup>  $\mu\text{Ci/cm}^2$ )] for all other alpha emitters; and

(iii) the non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm<sup>2</sup> (or the area of the surface if less than 300 cm<sup>2</sup>) does not exceed 4 x 10<sup>4</sup> Bq/cm<sup>2</sup> (1 µCi/cm<sup>2</sup>) for beta and gamma and low toxicity alpha emitters, or 4 x 10<sup>3</sup> Bq/cm<sup>2</sup> (10<sup>-2</sup> µCi/cm<sup>2</sup>) [(10<sup>-1</sup> µCi/cm<sup>2</sup>)] for all other alpha emitters.

(B) (No change.)

(39) Uniform Low-Level Radioactive Waste Manifest or uniform manifest--The combination of RC Forms **[BRC Forms]** 540, 541, and, if necessary, 542, and their respective continuation sheets as needed, or equivalent.

(40) - (42) (No change.)

(43) Waste description--The physical, chemical and radiological description of a LLRW as called for on RC Form **[BRC Form]** 541.

(44) - (46) (No change.)

(e) Transportation of radioactive material.

(1) Each licensee who transports radioactive material outside the site of usage as specified in the agency license, transports on public highways, or delivers radioactive material to a carrier for transport, shall comply with the applicable requirements of the DOT regulations in Title 49, CFR, Part 107, Parts 171 - 180, §387.7, §387.9, [171 - 189] and Parts 390 - 397 appropriate to the mode of transport. The licensee shall particularly note DOT regulations in the following areas:

(A) - (H) (No change.)

(I) Financial Responsibility - Title 49, CFR, §387.7 and §387.9.

(2) - (3) (No change.)

(4) Transporters of low-level radioactive waste to a Texas low-level radioactive waste disposal site shall submit proof of financial responsibility required by Title 49, CFR, §387.7 and §387.9, to the agency's Radiation Safety Licensing Branch and receive approval of this documentation from the agency prior to shipment.

(5) The agency shall review and determine alternate routes for the transportation and routing of radioactive material in accordance with 49 CFR, §397.103.

(f) Exemption for low-level radioactive materials.

(1) A licensee is exempt from all requirements of this section with respect to shipment or carriage of the following low-level materials:



(A) Natural material and ores containing naturally occurring radionuclides that are not intended to be processed for use of these radionuclides, provided the activity concentration of the material does not exceed 10 times the values specified in Table 257-4 of subsection (ee)(7) **[(ff)(7)]** of this section.

(B) Materials for which the activity concentration is not greater than the activity concentration values specified in Table 257-4 of subsection (ee)(7) **[(ff)(7)]** of this section, or for which the consignment activity is not greater than the limit for an exempt consignment found in Table 257-4 of subsection (ee)(7) **[(ff)(7)]** of this section.

(2) - (3) (No change.)

(g) - (h) (No change.)

(i) General license.

(1) - (2) (No change.)

(3) DOT specification container.

(A) (No change.)

(B) This general license applies only to a licensee who:

(i) has a quality assurance program required by subsections (s), (t), and (u) **[(t), (u), and (v)]** of this section and Title 10, CFR, Part 71, Subpart H;

(ii) - (iii) (No change.)

(C) (No change.)

(4) - (6) (No change.)

(j) (No change.)

(k) Preliminary determinations. Before the first use of any packaging for the shipment of licensed material the licensee shall:

(1) (No change.)

(2) where the maximum normal operating pressure will exceed 35 kPa (5 lbf/in<sup>2</sup>) **[(5 lb/in<sup>2</sup>)]** gauge, test the containment system at an internal pressure at least 50 percent higher than the maximum normal operating pressure, to verify the capability of that system to maintain its structural integrity at that pressure; and

(3) (No change.)

(l) (No change.)

(m) Air transport of plutonium.

(1) Notwithstanding the provisions of any general licenses and notwithstanding any exemptions stated directly in this section or included indirectly by citation of Title 49, CFR, Chapter I, as may be applicable, the licensee shall assure that plutonium in any form, whether for import, export, or domestic shipment, is not transported by air or delivered to a carrier for air transport unless:

(A) (No change.)

(B) the plutonium is contained in a material in which the specific activity is less than or equal to the activity concentration values for plutonium specified in Table 257-4 of subsection (ee)(7) [(ff)(7)] of this section, and in which the radioactivity is essentially uniformly distributed; or

(C) - (D) (No change.)

(2) - (3) (No change.)

(n) - (p) (No change.)

(q) Advance notification of transport of irradiated reactor fuel and certain radioactive waste.

(1) (No change.)

(2) Advance notification is required in accordance with this section for shipment of irradiated reactor fuel in quantities less than that subject to advance notification requirements of Title 10, CFR, §73.37. Advanced notification is also required under this subsection for shipments of radioactive material, other than irradiated fuel, meeting the following three conditions:

(A) - (B) (No change.)

(C) the quantity of radioactive waste in a single package exceeds the least of the following:

(i) 3000 times the  $A_1$  value of the radionuclides as specified in subsection (ee) [(ff)] of this section for special form radioactive material;

(ii) 3000 times the  $A_2$  value of the radionuclides as specified in subsection (ee) [(ff)] of this section for normal form radioactive material; or

(iii) (No change.)

(3) - (6) (No change.)

(r) (No change.)

**[(s) Inspections. Each shipment of LLRW to a licensed land disposal facility in Texas shall be inspected by the agency prior to shipment. The waste shipper shall notify the agency no less than 72 hours prior to the scheduled shipment of the intent to transport waste to the licensed land disposal facility.]**

(s) [(t)] Quality assurance requirements.

(1) Purpose. This subsection describes quality assurance requirements applying to design, purchase, fabrication, handling, shipping, storing, cleaning, assembly, inspection, testing, operation, maintenance, repair, and modification of components of packaging that are important to safety.

(A) Quality Assurance comprises all those planned and systematic actions necessary to provide adequate confidence that a system or component will perform satisfactorily in service.

(B) Quality assurance includes quality control, which comprises those quality assurance actions related to control of the physical characteristics and quality of the material or component to predetermined requirements.

(C) The licensee [license], certificate holder, and applicant for a CoC are responsible for the following:

(i) the quality assurance requirements as they apply to design, fabrication, testing, and modification of packaging; and

(ii) the quality assurance provision which applies to its use of a packaging for the shipment of licensed material subject to this subpart.

(2) Establishment of program. Each licensee, certificate holder, and applicant for a CoC shall:

(A) Establish, maintain, and execute a quality assurance program satisfying each of the applicable criteria of this subsection, subsections (s) and (t) [(t) and (u)] of this section and Title 10, CFR, §§71.101 through 71.137 and satisfying any specific provisions that are applicable to the licensee's activities including procurement of packaging; and

(B) Execute the applicable criteria in a graded approach to an extent that is commensurate with the quality assurance requirement's importance to safety.

(3) Approval of program. Before the use of any package for the shipment of licensed material subject to this subsection, each licensee shall:

(A) obtain agency approval of its quality assurance program; and

(B) file a description of its quality assurance program, including a discussion of which requirements of this subsection and subsections (t) and (u) **[(u) and (v)]** are applicable and how they will be satisfied.

(4) Radiography containers. A program for transport container inspection and maintenance limited to radiographic exposure devices, source changers, or packages transporting these devices and meeting the requirements of §289.255(m) of this title, is deemed to satisfy the requirements of subsection (i)(1)(B) of this section and paragraph (2) of this subsection.

(t) [(u)] Quality assurance organization. The licensee, certificate holder, and applicant for a CoC shall (while the term "licensee" is used in these criteria, the requirements are applicable to whatever design, fabricating, assembly, and testing of the package is accomplished with respect to a package before the time a package approval is issued):

(1) be responsible for the establishment and execution of the quality assurance program. The licensee, certificate holder, and applicant for a CoC may delegate to others, such as contractors, agents, or consultants, the work of establishing and executing the quality assurance program, or any part of the quality assurance program, but shall retain responsibility for the program; and

(2) clearly establish and delineate, in writing, the authority and duties of persons and organizations performing activities affecting the functions of structures, systems, and components that are important to safety. These activities include performing the functions associated with attaining quality objectives and the quality assurance functions.

(3) establish quality assurance functions as follows:

(A) assuring that an appropriate quality assurance program is established and effectively executed; and

(B) verifying , by procedures such as checking, auditing, and inspection, that activities affecting the functions that are important to safety have been correctly performed.

(4) assure that persons and organizations performing quality assurance functions have sufficient authority and organizational freedom to:

(A) identify quality problems;

(B) initiate, recommend, or provide solutions; and

(C) verify implementation of solutions.

(u) [(v)] Quality assurance program. A quality assurance program shall be maintained as follows:

(1) The licensee, certificate holder, and applicant for a CoC shall:

(A) establish, at the earliest practicable time consistent with the schedule for accomplishing the activities, a quality assurance program that complies with the requirements of this section and Title 10, CFR, §§71.101 through 71.137 **[§§71.01 through 71.137]**;

(B) document the quality assurance program by written procedures or instructions and shall carry out the program in accordance with those procedures throughout the period during which the packaging is used; and

(C) identify the material and components to be covered by the quality assurance program, the major organizations participating in the program, and the designated functions of these organizations.

(2) The licensee, certificate holder, and applicant for a CoC, through its quality assurance program, shall:

(A) provide control over activities affecting the quality of the identified materials and components to an extent consistent with their importance to safety, and as necessary to assure conformance to the approved design of each individual package used for the shipment of radioactive material;

(B) assure that activities affecting quality are accomplished under suitable controlled conditions which include:

(i) the use of appropriate equipment;

(ii) suitable environmental conditions for accomplishing the activity, such as adequate cleanliness; and

(iii) all prerequisites for the given activity have been satisfied; and

(C) take into account the need for special controls, processes, test equipment, tools, and skills to attain the required quality, and the need for verification of quality by inspection and test.

(3) The licensee, certificate holder, and applicant for a CoC shall base the requirements and procedures of its quality assurance program on the following considerations concerning the complexity and proposed use of the package and its components.

(A) The impact of malfunction or failure of the item to safety;

(B) The design and fabrication complexity or uniqueness of the item;

(C) The need for special controls and surveillance over processes and equipment;

(D) The degree to which functional compliance can be demonstrated by inspection or test; and

(E) The quality history and degree of standardization of the item.

(4) The licensee, certificate holder, and applicant for a CoC shall provide for indoctrination and training of personnel performing activities affecting quality, as necessary to assure that suitable proficiency is achieved and maintained.

(5) The licensee, certificate holder, and applicant for a CoC shall review the status and adequacy of the quality assurance program at established intervals. Management of other organizations participating in the quality assurance program shall review regularly the status and adequacy of that part of the quality assurance program they are executing.

(v) [(w)] Quality control program. Each shipper shall adopt a quality control program to include verification of the following to ensure that shipping containers are suitable for shipments to a licensed disposal facility:

(1) identification of appropriate container(s);

(2) container testing documentation is adequate;

(3) appropriate container used;

(4) container packaged appropriately;

(5) container labeled appropriately;

(6) manifest filled out appropriately; and

(7) documentation maintained of each step.

(w) [(x)] Handling, storage, and shipping control. The licensee, certificate holder, and applicant for a CoC shall establish measures to control, in accordance with instructions, the handling, storage, shipping, cleaning, and preservation of materials and equipment to be used in packaging to prevent damage or deterioration. When necessary for particular products, special protective environments, such as inert gas atmosphere, and specific moisture content and temperature levels must be specified and provided.

(x) [(y)] Inspection, test, and operating status. Measures to track inspection, test and operating status shall be established as follows.

(1) The licensee, certificate holder, and applicant for a CoC shall establish measures to indicate, by the use of markings such as stamps, tags, labels, routing cards, or other suitable means, the status of inspections and tests performed upon individual items of the packaging. These measures must provide for the identification of items that have satisfactorily passed required inspections and tests, where necessary to preclude inadvertent bypassing of the inspections and tests; and

(2) The licensee, shall establish measures to identify the operating status of components of the packaging, such as tagging valves and switches, to prevent inadvertent operation.

(y) **[(z)]** Nonconforming materials, parts, or components. The licensee, certificate holder, and applicant for a CoC shall establish measures to control materials, parts, or components that do not conform to the licensee's requirements to prevent their inadvertent use or installation. These measures must include the following, as appropriate;

(1) procedures for identification, documentation, segregation, disposition, and notification to affected organizations; and

(2) nonconforming items must be reviewed and accepted, rejected, repaired, or reworked in accordance with documented procedures.

(z) **[(aa)]** Corrective action. The licensee, certificate holder, and applicant for a CoC shall establish measures to assure that conditions adverse to quality, such as deficiencies, deviations, defective material and equipment, and nonconformances, are promptly identified and corrected.

(1) In the case of a significant condition adverse to quality, the measures must assure that the cause of the condition is determined and corrective action taken to preclude repetition.

(2) The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken must be documented and reported to appropriate levels of management.

(aa) **[(bb)]** Quality assurance records. The licensee, certificate holder, and applicant for a CoC shall maintain written records sufficient to describe the activities affecting quality for inspection by the agency for 3 years beyond the date when the licensee, certificate holder, and applicant for a CoC last engage in the activity for which the quality assurance program was developed. If any portion of the written procedures or instructions is superseded, the licensee, certificate holder, and applicant for a CoC shall retain the superseded material for 3 years after it is superseded. The records must include the following;

(1) instructions, procedures, and drawings to prescribe quality assurance activities closely related specifications such as required qualifications of personnel, procedures, and equipment.

(2) instructions or procedures which establish a records retention program that is consistent with applicable regulations and designates factors such as duration, location, and assigned responsibility.

(bb) ~~[(cc)]~~ Audits. The licensee, certificate holder, and applicant for a CoC shall carry out a comprehensive system of planned and periodic audits, to verify compliance with all aspects of the quality assurance program, and to determine the effectiveness of the program. The audit program shall include:

(1) performance in accordance with written procedures or checklists by appropriately trained personnel not having direct responsibilities in the area being audited;

(2) documented results that are reviewed by management having responsibility in the area audited; and

(3) follow-up action, including reaudit of deficient areas, shall be taken where indicated.

(cc) ~~[(dd)]~~ Transfer for disposal and manifests.

(1) The requirements of this section and subsection (ff) ~~[(gg)]~~ of this section are designed to:

(A) control transfers of LLRW by any waste generator, waste collector, or waste processor licensee, as defined in this section, who ships LLRW either directly, or indirectly through a waste collector or waste processor, to a licensed LLRW land disposal facility, as defined in §289.201(b) of this title;

(B) establish a manifest tracking system; and

(C) supplement existing requirements concerning transfers and recordkeeping for those wastes.

(2) Beginning March 1, 1998, all affected licensees shall use subsection (ff) ~~[(gg)]~~ of this section.

(3) Each shipment of LLRW intended for disposal at a licensed land disposal facility shall be accompanied by a shipment manifest in accordance with subsection (ff)(1) ~~[(gg)(1)]~~ of this section.

(4) Any licensee shipping LLRW intended for ultimate disposal at a licensed land disposal facility shall document the information required on the uniform manifest and transfer this recorded manifest information to the intended consignee in accordance with subsection (ff) ~~[(gg)]~~ of this section.



(5) Each shipment manifest shall include a certification by the waste generator as specified in subsection ~~(ff)(10)~~ [(gg)(10)] of this section, as appropriate.

(6) Each person involved in the transfer for disposal and disposal of LLRW, including the waste generator, waste collector, waste processor, and disposal facility operator, shall comply with the requirements specified in subsection ~~(ff)~~ [(gg)] of this section, as appropriate.

(7) Any licensee shipping LLRW to a licensed Texas LLRW disposal facility shall comply with the waste acceptance criteria in 30 Texas Administrative Code (TAC) Part 1, Chapter 336.

(dd) [(ee)] Fees.

(1) Each shipper shall be assessed a fee for shipments of LLRW originating in Texas or originating out-of-state being shipped to a licensed Texas LLRW disposal facility and these fees shall be:

(A) \$10 per cubic foot of shipped LLRW;

(B) collected by the department **[compact waste disposal facility and remitted to the TCEQ]** and deposited to the credit of the radiation and perpetual care account; and

(C) used exclusively by the agency for emergency planning for and response to transportation accidents involving LLRW.

(2) Fee assessments in accordance with this section shall be suspended when the amount of fees collected reaches \$500,000, except that if the balance of fees collected is reduced to \$350,000 or less, the assessments shall be reinstituted to bring the balance of fees collected to \$500,000.

(3) Money expended from the radiation and perpetual care account to respond to accidents involving LLRW shall be reimbursed to the radiation and perpetual care account by the responsible shipper or transporter according to rules adopted by the board.

(4) For purposes of this subsection, "shipper" means a person who generates low-level radioactive waste and ships or arranges with others to ship the waste to a disposal site.

(ee) [(ff)] Appendices for determination of  $A_1$  and  $A_2$ .

(1) Values of  $A_1$  and  $A_2$ . Values of  $A_1$  and  $A_2$  for individual radionuclides, which are the bases for many activity limits elsewhere in these rules are given in Table 257-3 of paragraph (6) of this subsection. The curie (Ci) values specified are obtained by converting from the terabecquerel (TBq) figure. The Terabecquerel values are the regulatory standard. The curie values are for information only and are not intended to be the regulatory standard. Where values

of  $A_1$  or  $A_2$  are unlimited, it is for radiation control purposes only. For nuclear criticality safety, some materials are subject to controls placed on fissile material.

(2) Values of radionuclides not listed.

(A) For individual radionuclides whose identities are known, but are not listed in Table 257-3 of paragraph (6) of this subsection, the  $A_1$  and  $A_2$  values contained in Table 257-5 of paragraph (8) of this subsection may be used. Otherwise, the licensee shall obtain prior NRC approval of the  $A_1$  and  $A_2$  values for radionuclides not listed in Table 257-3 of paragraph (6) of this subsection, before shipping the material.

(B) For individual radionuclides whose identities are known, but that are not listed in Table 257-4 of paragraph (7) of this subsection, the exempt material activity concentration and exempt consignment activity values contained in Table 257-5 of paragraph (8) of this subsection may be used. Otherwise, the licensee shall obtain prior approval of the exempt material activity concentration and exempt consignment activity values, for radionuclides not listed in Table 257-3 of paragraph (6) of this subsection, before shipping the material.

(C) The licensee shall submit requests for prior approval, described in subparagraphs (A) and (B) of this paragraph to the agency.

(3) Calculations of  $A_1$  and  $A_2$  for a radionuclide not in Table 257-3 of paragraph (6) of this subsection. In the calculations of  $A_1$  and  $A_2$  for a radionuclide not in Table 257-3 of paragraph (6) of this subsection, a single radioactive decay chain, in which radionuclides are present in their naturally occurring proportions, and in which no daughter radionuclide has a half-life either longer than ten days, or longer than that of the parent radionuclide, shall be considered as a single radionuclide, and the activity to be taken into account and the  $A_1$  or  $A_2$  value to be applied shall be those corresponding to the parent radionuclide of that chain. In the case of radioactive decay chains in which any daughter radionuclide has a half-life either longer than ten days, or greater than that of the parent radionuclide, the parent and those daughter radionuclides shall be considered as mixtures of different radionuclides.

(4) Determination for mixtures of radionuclides whose identities and respective activities are known. For mixtures of radionuclides whose identities and respective activities are known, the following conditions apply.

(A) For special form radioactive material, the maximum quantity transported in a Type A package is as follows:

Figure: 25 TAC §289.257(ee)(4)(A) [Figure: 25 TAC §289.257(ff)(4)(A)]

(B) For normal form radioactive material, the maximum quantity transported in a Type A package is as follows:

Figure: 25 TAC §289.257(ee)(4)(B) [Figure: 25 TAC §289.257(ff)(4)(B)]

(C) Alternatively, an  $A_1$  value for mixtures of special form material may be determined as follows:

Figure: 25 TAC §289.257(ee)(4)(C) [Figure: 25 TAC §289.257(ff)(4)(C)]

(D) An  $A_2$  value for mixtures of normal form material may be determined as follows:

Figure: 25 TAC §289.257(ee)(4)(D) [Figure: 25 TAC §289.257(ff)(4)(D)]

(E) The exempt activity concentration for mixtures of nuclides may be determined as follows:

Figure: 25 TAC §289.257(ee)(4)(E) [Figure: 25 TAC §289.257(ff)(4)(E)]

(F) The activity limit for an exempt consignment for mixtures of radionuclides may be determined as follows:

Figure: 25 TAC §289.257(ee)(4)(F) [Figure: 25 TAC §289.257(ff)(4)(F)]

(5) Determination when activities of some of the radionuclides are not known. When the identity of each radionuclide is known, but the individual activities of some of the radionuclides are not known, the radionuclides may be grouped and the lowest  $A_1$  or  $A_2$  value, as appropriate, for the radionuclides in each group may be used in applying the formulas in paragraph (4) of this subsection. Groups may be based on the total alpha activity and the total beta/gamma activity when these are known, using the lowest  $A_1$  or  $A_2$  values for the alpha emitters and beta/gamma emitters.

(6)  $A_1$  and  $A_2$  values for radionuclides. The following Table 257-3 contains  $A_1$  and **[an]**  $A_2$  values for radionuclides:

Figure: 25 TAC §289.257(ee)(6) [Figure: 25 TAC §289.257(ff)(6)]

(7) Exempt material activity concentrations and exempt consignment activity limits for radionuclides. The following Table 257-4 contains exempt material activity concentrations and exempt consignment activity limits for radionuclides:

Figure: 25 TAC §289.257(ee)(7) [Figure: 25 TAC §289.257(ff)(7)]

(8) General values for  $A_1$  and  $A_2$ . The following Table 257-5 contains general values for  $A_1$  and  $A_2$ :

Figure: 25 TAC §289.257(ee)(8) [Figure: 25 TAC §289.257(ff)(8)]

(9) Activity-mass relationships for uranium. The following Table 257-6 contains activity-mass relationships for uranium:

Figure: 25 TAC §289.257(ee)(9) **[Figure: 25 TAC §289.257(ff)(9)]**

(ff) **[(gg)]** Appendices for the requirements for transfers of LLRW intended for disposal at licensed land disposal facilities and manifests.

(1) Manifest. A waste generator, collector, or processor who transports, or offers for transportation, LLRW intended for ultimate disposal at a licensed LLRW land disposal facility shall prepare a manifest reflecting information requested on applicable RC Forms **[BRC Forms]** 540 (Uniform Low-Level Radioactive Waste Manifest (Shipping Paper)) and 541 (Uniform Low-Level Radioactive Waste Manifest (Container and Waste Description)) and, if necessary, on an applicable RC Form **[BRC Form]** 542 (Uniform Low-Level Radioactive Waste Manifest (Manifest Index and Regional Compact Tabulation)) or their equivalent. RC Forms **[BRC Forms]** 540 and 540A shall be completed and shall physically accompany the pertinent LLRW shipment. Upon agreement between shipper and consignee, RC Forms **[BRC Forms]** 541, 541A and 541B, and 542 and 542A may be completed, transmitted, and stored in electronic media with the capability for producing legible, accurate, and complete records on the respective forms. Licensees are not required by the agency to comply with the manifesting requirements of this section when they ship:

(A) LLRW for processing and expect its return (i.e., for storage in accordance with their license) prior to disposal at a licensed land disposal facility;

(B) LLRW that is being returned to the licensee who is the waste generator or generator, as defined in this section; or

(C) radioactively contaminated material to a waste processor that becomes the processor's residual waste.

(2) Form instructions. For guidance in completing these forms, refer to the instructions that accompany the forms. Copies of manifests required by this subsection may be legible carbon copies, photocopies, or computer printouts that reproduce the data in the format of the uniform manifest.

(3) Forms. RC Forms **[BRC Forms]** 540, 540A, 541, 541A, 541B, 542 and 542A, and the accompanying instructions, in hard copy, may be obtained from the agency.

(4) Information requirements of the DOT. This subsection includes information requirements of the DOT, as codified in Title 49, CFR, Part 172. Information on hazardous, medical, or other waste, required to meet EPA regulations, as codified in Title 40, CFR, Parts 259 and 261 or elsewhere, is not addressed in this section, and shall be provided on the required EPA forms. However, the required EPA forms shall accompany the uniform manifest required by this section.

(5) General information. The shipper of the LLRW, shall provide the following information on the uniform manifest:

(A) the name, facility address, and telephone number of the licensee shipping the waste;

(B) an explicit declaration indicating whether the shipper is acting as a waste generator, collector, processor, or a combination of these identifiers for purposes of the manifested shipment; and

(C) the name, address, and telephone number, or the name and EPA identification number for the carrier transporting the waste.

(6) Shipment information. The shipper of the LLRW shall provide the following information regarding the waste shipment on the uniform manifest:

(A) the date of the waste shipment;

(B) the total number of packages/disposal containers;

(C) the total disposal volume and disposal weight in the shipment;

(D) the total radionuclide activity in the shipment;

(E) the activity of each of the radionuclides hydrogen-3 [**hydrogren-3**], carbon-14, technetium-99, and iodine-129 [, **radium-226**] contained in the shipment; and

(F) the total masses of uranium-233, uranium-235, and plutonium in special nuclear material, and the total mass of uranium and thorium in source material.

(7) Disposal container and waste information. The shipper of the LLRW shall provide the following information on the uniform manifest regarding the waste and each disposal container of waste in the shipment:

(A) an alphabetic or numeric identification that uniquely identifies each disposal container in the shipment;

(B) a physical description of the disposal container, including the manufacturer and model of any high integrity container;

(C) the volume displaced by the disposal container;

(D) the gross weight of the disposal container, including the waste;

(E) for waste consigned to a disposal facility, the maximum radiation level at the surface of each disposal container;

(F) a physical and chemical description of the waste;

(G) the total weight percentage of chelating agent for any waste containing more than 0.1% chelating agent by weight, plus the identity of the principal chelating agent;

(H) the approximate volume of waste within a container;

(I) the sorbing or solidification media, if any, and the identity of the solidification media vendor and brand name;

(J) the identities and activities of individual radionuclides contained in each container, the masses of uranium-233, uranium-235, and plutonium in special nuclear material, and the masses of uranium and thorium in source material. For discrete waste types (i.e., activated materials, contaminated equipment, mechanical filters, sealed source/devices, and wastes in solidification/stabilization media), the identities and activities of individual radionuclides associated with or contained on these waste types within a disposal container shall be reported;

(K) the total radioactivity within each container; and

(L) for wastes consigned to a disposal facility, the classification of the waste in accordance with §289.202(ggg)(4)(A) of this title. Waste not meeting the structural stability requirements of §289.202(ggg)(4)(B)(ii) of this title shall be identified.

(8) Uncontainerized waste information. The shipper of the LLRW shall provide the following information on the uniform manifest regarding a waste shipment delivered without a disposal container:

(A) the approximate volume and weight of the waste;

(B) a physical and chemical description of the waste;

(C) the total weight percentage of chelating agent if the chelating agent exceeds 0.1% by weight, plus the identity of the principal chelating agent;

(D) for waste consigned to a disposal facility, the classification of the waste in accordance with §289.202(ggg)(4)(A) of this title. Waste not meeting the structural stability requirements of §289.202(ggg)(4)(B)(ii) of this title shall be identified;

(E) the identities and activities of individual radionuclides contained in the waste, the masses of uranium-233, uranium-235, and plutonium in special nuclear material, and the masses of uranium and thorium in source material; and

(F) for wastes consigned to a disposal facility, the maximum radiation levels at the surface of the waste.

(9) Multi-generator disposal container information. This paragraph applies to disposal containers enclosing mixtures of waste originating from different generators. (Note: The

origin of the LLRW resulting from a processor's activities may be attributable to one or more generators (including waste generators) as defined in this section). It also applies to mixtures of wastes shipped in an uncontainerized form, for which portions of the mixture within the shipment originate from different generators.

(A) For homogeneous mixtures of waste, such as incinerator ash, provide the waste description applicable to the mixture and the volume of the waste attributed to each generator.

(B) For heterogeneous mixtures of waste, such as the combined products from a large compactor, identify each generator contributing waste to the disposal container, and, for discrete waste types (i.e., activated materials, contaminated equipment, mechanical filters, sealed source/devices, and wastes in solidification/stabilization media), the identities and activities of individual radionuclides contained on these waste types within the disposal container. For each generator, provide the following:

(i) the volume of waste within the disposal container;

(ii) a physical and chemical description of the waste, including the solidification agent, if any;

(iii) the total weight percentage of chelating agents for any disposal container containing more than 0.1% chelating agent by weight, plus the identity of the principal chelating agent;

(iv) the sorbing or solidification media, if any, and the identity of the solidification media vendor and brand name if the media is claimed to meet stability requirements in §289.202(ggg)(4)(B)(ii) of this title; and

(v) radionuclide identities and activities contained in the waste, the masses of uranium-233, uranium-235, and plutonium in special nuclear material, and the masses of uranium and thorium in source material if contained in the waste.

(10) Certification. An authorized representative of the waste generator, processor, or collector shall certify by signing and dating the shipment manifest that the transported materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the agency. A collector in signing the certification is certifying that nothing has been done to the collected waste that would invalidate the waste generator's certification.

(11) Control and tracking.

(A) Any licensee who transfers LLRW to a land disposal facility or a licensed waste collector shall comply with the requirements in clauses (i) - (ix) of this subparagraph. Any licensee who transfers waste to a licensed waste processor for waste

treatment or repackaging shall comply with the requirements of clauses (iv) - (ix) of this subparagraph. A licensee shall:

(i) prepare all wastes so that the waste is classified according to §289.202(ggg)(4)(A) of this title and meets the waste characteristic requirements in §289.202(ggg)(4)(B) of this title;

(ii) label each disposal container (or transport package if potential radiation hazards preclude labeling of the individual disposal container) of waste to identify whether it is Class A waste, Class B waste, Class C waste, or greater than Class C waste, in accordance with §289.202(ggg)(4)(A) of this title;

(iii) conduct a quality assurance program to assure compliance with §289.202(ggg)(4)(A) and (B) of this title;

(iv) prepare the uniform manifest as required by this subsection;

(v) forward a copy or electronically transfer the uniform manifest to the intended consignee so that either:

(I) receipt of the manifest precedes the LLRW shipment;  
and

(II) the manifest is delivered to the consignee with the waste at the time the waste is transferred to the consignee. Using both subclauses (I) and (II) of this clause are also acceptable;

(vi) include the uniform manifest with the shipment regardless of the option chosen in clause (v) of this subparagraph;

(vii) receive acknowledgement of the receipt of the shipment in the form of a signed copy of the uniform manifest;

(viii) retain a copy of or electronically store the uniform manifest and documentation of acknowledgement of receipt as the record of transfer of radioactive material as required by §289.251 of this title and §289.252 of this title, **and §289.254 of this title**; and

(ix) for any shipments or any part of a shipment for which acknowledgement of receipt has not been received within the times set forth in this subsection, conduct an investigation in accordance with subparagraph (D) of this paragraph.

(B) Any waste collector licensee who handles only prepackaged waste shall:

(i) acknowledge receipt of the waste from the shipper within one week of receipt by returning a signed copy of the uniform manifest;



(ii) prepare a new uniform manifest to reflect consolidated shipments that meet the requirements of this subsection. The waste collector shall ensure that, for each container of waste in the shipment, the uniform manifest identifies the generator of that container of waste;

(iii) forward a copy or electronically transfer the uniform manifest to the intended consignee so that either:

(I) receipt of the uniform manifest precedes the LLRW shipment; or

(II) the uniform manifest is delivered to the consignee with the waste at the time the waste is transferred to the consignee. Using both subclauses (I) and (II) of this clause are also acceptable;

(iv) include the uniform manifest with the shipment regardless of the option chosen in clause (iii) of this subparagraph;

(v) receive acknowledgement of the receipt of the shipment in the form of a signed copy of the uniform manifest;

(vi) retain a copy of or electronically store the uniform manifest and documentation of acknowledgement of receipt as the record of transfer of radioactive material as required by §289.251 of this title and[,] §289.252 of this title[, **and §289.254 of this title**];

(vii) for any shipments or any part of a shipment for which acknowledgement of receipt has not been received within the times set forth in accordance with this clause, conduct an investigation in accordance with subparagraph (D) of this paragraph; and

(viii) notify the shipper and the agency when any shipment, or part of a shipment, has not arrived within 60 days after receipt of an advance uniform manifest, unless notified by the shipper that the shipment has been cancelled.

(C) Any licensed waste processor who treats or repackages waste shall:

(i) acknowledge receipt of the waste from the shipper within one week of receipt by returning a signed copy of the uniform manifest;

(ii) prepare a new uniform manifest that meets the requirements of this subsection. Preparation of the new uniform manifest reflects that the processor is responsible for meeting these requirements. For each container of waste in the shipment, the manifest shall identify the waste generators, the preprocessed waste volume, and the other information as required in clause (i) of this subparagraph;

(iii) prepare all wastes so that the waste is classified according to §289.202(ggg)(4)(A) of this title and meets the waste characteristics requirements in §289.202(ggg)(4)(B) of this title;

(iv) label each package of waste to identify whether it is Class A waste, Class B waste, or Class C waste, in accordance with §289.202(ggg)(4)(A) and (C) of this title;

(v) conduct a quality assurance program to assure compliance with §289.202(ggg)(4)(A) and (B) of this title;

(vi) forward a copy or electronically transfer the uniform manifest to the intended consignee so that either:

(I) receipt of the uniform manifest precedes the LLRW shipment; or

(II) the uniform manifest is delivered to the consignee with the waste at the time the waste is transferred to the consignee. Using both subclause (I) of this clause and this subclause is also acceptable;

(vii) include the uniform manifest with the shipment regardless of the option chosen in clause (vi) of this subparagraph;

(viii) receive acknowledgement of the receipt of the shipment in the form of a signed copy of the uniform manifest;

(ix) retain a copy of or electronically store the uniform manifest and documentation of acknowledgement of receipt as the record of transfer of radioactive material as required by §289.251 of this title and §289.252 of this title, **and §289.254 of this title**;

(x) for any shipment or any part of a shipment for which acknowledgement of receipt has not been received within the times set forth in accordance with this clause, conduct an investigation in accordance with clause (v) of this subparagraph; and

(xi) notify the shipper and the agency when any shipment, or part of a shipment, has not arrived within 60 days after receipt of an advance uniform manifest, unless notified by the shipper that the shipment has been cancelled.

(D) Any shipment or part of a shipment for which acknowledgement is not received within the times set forth in accordance with this section shall undergo the following:

(i) be investigated by the shipper if the shipper has not received notification or receipt within 20 days after transfer; and

(ii) be traced and reported. The investigation shall include tracing the shipment and filing a report with the agency. Each licensee who conducts a trace investigation shall file a written report with the agency within two weeks of completion of the investigation.

Figure: 25 TAC §289.257(ee)(4)(A)

$$\sum_i \frac{B(i)}{A_1(i)} \leq 1$$

where B(i) is the activity of radionuclide I, and A<sub>1</sub>(i) is the A<sub>1</sub> value for radionuclide I.

Figure: 25 TAC §289.257(ee)(4)(B)

$$\sum_i \frac{B(i)}{A_2(i)} \leq 1$$

where B(i) is the activity of radionuclide I and A<sub>2</sub>(i) is the A<sub>2</sub> value for radionuclide I.

Figure: 25 TAC §289.257(ee)(4)(C)

$$A_1 \text{ for mixture} = \frac{1}{\sum_i \frac{f(i)}{A_1(i)}}$$

where f(i) is the fraction of activity of nuclide I in the mixture and A<sub>1</sub>(i) is the appropriate A<sub>1</sub> value for nuclide I.

Figure: 25 TAC §289.257(ee)(4)(D)

$$A_2 \text{ for mixture} = \frac{1}{\sum_i \frac{f(i)}{A_2(i)}}$$

where f(i) is the fraction of activity of nuclide I in the mixture and A<sub>2</sub>(i) is the appropriate A<sub>2</sub> value for nuclide I.

Figure: 25 TAC §289.257(ee)(4)(E)

$$\text{Exempt activity concentration for mixture} = \frac{1}{\sum \frac{f(i)}{[A](i)}}$$

where f(i) is the fraction of activity concentration of radionuclide I in the mixture, and [A] is the activity concentration for exempt material containing radionuclide I.

Figure: 25 TAC §289.257(ee)(4)(F)

$$\text{Exempt activity concentration for mixture} = \frac{1}{\sum \frac{f(i)}{A(i)}}$$

where f(i) is the fraction of activity of radionuclide I in the mixture, and A is the activity limit for exempt consignments for radionuclide I.

Table 257-3

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
Ac-225 (a)	Actinium (89)	8.0X10 <sup>-1</sup>	2.2X10 <sup>1</sup>	6.0X10 <sup>-3</sup>	1.6X10 <sup>-1</sup>	2.1X10 <sup>3</sup>	5.8X10 <sup>4</sup>
Ac-227 (a)		9.0X10 <sup>-1</sup>	2.4X10 <sup>1</sup>	9.0X10 <sup>-5</sup>	2.4X10 <sup>-3</sup>	2.7	7.2X10 <sup>1</sup>
Ac-228		6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	8.4X10 <sup>4</sup>	2.2X10 <sup>6</sup>
Ag-105	Silver (47)	2.0	5.4X10 <sup>1</sup>	2.0	5.4X10 <sup>1</sup>	1.1X10 <sup>3</sup>	3.0X10 <sup>4</sup>
Ag-108m (a)		7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	9.7X10 <sup>-1</sup>	2.6X10 <sup>1</sup>
Ag-110m (a)		4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	1.8X10 <sup>2</sup>	4.7X10 <sup>3</sup>
Ag-111		2.0	5.4X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	5.8X10 <sup>3</sup>	1.6X10 <sup>5</sup>
Al-26	Aluminum (13)	1.0X10 <sup>-1</sup>	2.7	1.0X10 <sup>-1</sup>	2.7	7.0X10 <sup>-4</sup>	1.9X10 <sup>-2</sup>
Am-241	Americium (95)	1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	1.0X10 <sup>-3</sup>	2.7X10 <sup>-2</sup>	1.3X10 <sup>-1</sup>	3.4
Am-242m (a)		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	1.0X10 <sup>-3</sup>	2.7X10 <sup>-2</sup>	3.6X10 <sup>-1</sup>	1.0X10 <sup>1</sup>
Am-243 (a)		5.0	1.4X10 <sup>2</sup>	1.0X10 <sup>-3</sup>	2.7X10 <sup>-2</sup>	7.4X10 <sup>-3</sup>	2.0X10 <sup>-1</sup>
Ar-37	Argon (18)	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	3.7X10 <sup>3</sup>	9.9X10 <sup>4</sup>
Ar-39		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	1.3	3.4X10 <sup>1</sup>
Ar-41		3.0X10 <sup>-1</sup>	8.1	3.0X10 <sup>-1</sup>	8.1	1.5X10 <sup>6</sup>	4.2X10 <sup>7</sup>
As-72	Arsenic (33)	3.0X10 <sup>-1</sup>	8.1	3.0X10 <sup>-1</sup>	8.1	6.2X10 <sup>4</sup>	1.7X10 <sup>6</sup>
As-73		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	8.2X10 <sup>2</sup>	2.2X10 <sup>4</sup>
As-74		1.0	2.7X10 <sup>1</sup>	9.0X10 <sup>-1</sup>	2.4X10 <sup>1</sup>	3.7X10 <sup>3</sup>	9.9X10 <sup>4</sup>
As-76		3.0X10 <sup>-1</sup>	8.1	3.0X10 <sup>-1</sup>	8.1	5.8X10 <sup>4</sup>	1.6X10 <sup>6</sup>
As-77		2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	3.9X10 <sup>4</sup>	1.0X10 <sup>6</sup>

Figure: 25 TAC §289.257(ee)(6)

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
At-211 (a)	Astatine (85)	2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	7.6X10 <sup>4</sup>	2.1X10 <sup>6</sup>
Au-193	Gold (79)	7.0	1.9X10 <sup>2</sup>	2.0	5.4X10 <sup>1</sup>	3.4X10 <sup>4</sup>	9.2X10 <sup>5</sup>
Au-194		1.0	2.7X10 <sup>1</sup>	1.0	2.7X10 <sup>1</sup>	1.5X10 <sup>4</sup>	4.1X10 <sup>5</sup>
Au-195		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	6.0	1.6X10 <sup>2</sup>	1.4X10 <sup>2</sup>	3.7X10 <sup>3</sup>
Au-198		1.0	2.7X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	9.0X10 <sup>3</sup>	2.4X10 <sup>5</sup>
Au-199		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	7.7X10 <sup>3</sup>	2.1X10 <sup>5</sup>
Ba-131 (a)	Barium (56)	2.0	5.4X10 <sup>1</sup>	2.0	5.4X10 <sup>1</sup>	3.1X10 <sup>3</sup>	8.4X10 <sup>4</sup>
Ba-133		3.0	8.1X10 <sup>1</sup>	3.0	8.1X10 <sup>1</sup>	9.4	2.6X10 <sup>2</sup>
Ba-133m		2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	2.2X10 <sup>4</sup>	6.1X10 <sup>5</sup>
Ba-140 (a)		5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	3.0X10 <sup>-1</sup>	8.1	2.7X10 <sup>3</sup>	7.3X10 <sup>4</sup>
Be-7	Beryllium (4)	2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	1.3X10 <sup>4</sup>	3.5X10 <sup>5</sup>
Be-10		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	8.3X10 <sup>-4</sup>	2.2X10 <sup>-2</sup>
Bi-205	Bismuth (83)	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	1.5X10 <sup>3</sup>	4.2X10 <sup>4</sup>
Bi-206		3.0X10 <sup>-1</sup>	8.1	3.0X10 <sup>-1</sup>	8.1	3.8X10 <sup>3</sup>	1.0X10 <sup>5</sup>
Bi-207		7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	1.9	5.2X10 <sup>1</sup>
Bi-210		1.0	2.7X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	4.6X10 <sup>3</sup>	1.2X10 <sup>5</sup>
Bi-210m (a)		6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	2.0X10 <sup>-2</sup>	5.4X10 <sup>-1</sup>	2.1X10 <sup>-5</sup>	5.7X10 <sup>-4</sup>
Bi-212 (a)		7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	5.4X10 <sup>5</sup>	1.5X10 <sup>7</sup>
Bk-247	Berkelium (97)	8.0	2.2X10 <sup>2</sup>	8.0X10 <sup>-4</sup>	2.2X10 <sup>-2</sup>	3.8X10 <sup>-2</sup>	1.0
Bk-249 (a)		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	3.0X10 <sup>-1</sup>	8.1	6.1X10 <sup>1</sup>	1.6X10 <sup>3</sup>

Figure: 25 TAC §289.257(ee)(6)

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
Br-76	Bromine (35)	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	9.4X10 <sup>4</sup>	2.5X10 <sup>6</sup>
Br-77		3.0	8.1X10 <sup>1</sup>	3.0	8.1X10 <sup>1</sup>	2.6X10 <sup>4</sup>	7.1X10 <sup>5</sup>
Br-82		4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>4</sup>	1.1X10 <sup>6</sup>
C-11	Carbon (6)	1.0	2.7X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	3.1X10 <sup>7</sup>	8.4X10 <sup>8</sup>
C-14		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	3.0	8.1X10 <sup>1</sup>	1.6X10 <sup>-1</sup>	4.5
Ca-41	Calcium (20)	Unlimited	Unlimited	Unlimited	Unlimited	3.1X10 <sup>-3</sup>	8.5X10 <sup>-2</sup>
Ca-45		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	1.0	2.7X10 <sup>1</sup>	6.6X10 <sup>2</sup>	1.8X10 <sup>4</sup>
Ca-47 (a)		3.0	8.1X10 <sup>1</sup>	3.0X10 <sup>-1</sup>	8.1	2.3X10 <sup>4</sup>	6.1X10 <sup>5</sup>
Cd-109	Cadmium (48)	3.0X10 <sup>1</sup>	8.1X10 <sup>2</sup>	2.0	5.4X10 <sup>1</sup>	9.6X10 <sup>1</sup>	2.6X10 <sup>3</sup>
Cd-113m		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	8.3	2.2X10 <sup>2</sup>
Cd-115 (a)		3.0	8.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	1.9X10 <sup>4</sup>	5.1X10 <sup>5</sup>
Cd-115m		5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	9.4X10 <sup>2</sup>	2.5X10 <sup>4</sup>
Ce-139	Cerium (58)	7.0	1.9X10 <sup>2</sup>	2.0	5.4X10 <sup>1</sup>	2.5X10 <sup>2</sup>	6.8X10 <sup>3</sup>
Ce-141		2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	1.1X10 <sup>3</sup>	2.8X10 <sup>4</sup>
Ce-143		9.0X10 <sup>-1</sup>	2.4X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	2.5X10 <sup>4</sup>	6.6X10 <sup>5</sup>
Ce-144 (a)		2.0X10 <sup>-1</sup>	5.4	2.0X10 <sup>-1</sup>	5.4	1.2X10 <sup>2</sup>	3.2X10 <sup>3</sup>
Cf-248	Californium (98)	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	6.0X10 <sup>-3</sup>	1.6X10 <sup>-1</sup>	5.8X10 <sup>1</sup>	1.6X10 <sup>3</sup>
Cf-249		3.0	8.1X10 <sup>1</sup>	8.0X10 <sup>-4</sup>	2.2X10 <sup>-2</sup>	1.5X10 <sup>-1</sup>	4.1
Cf-250		2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	2.0X10 <sup>-3</sup>	5.4X10 <sup>-2</sup>	4.0	1.1X10 <sup>2</sup>
Cf-251		7.0	1.9X10 <sup>2</sup>	7.0X10 <sup>-4</sup>	1.9X10 <sup>-2</sup>	5.9X10 <sup>-2</sup>	1.6

Figure: 25 TAC §289.257(ee)(6)

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
Cf-252 (h)		5.0X10 <sup>-2</sup>	1.4	3.0X10 <sup>-3</sup>	8.1X10 <sup>-2</sup>	2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>
Cf-253 (a)		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	4.0X10 <sup>-2</sup>	1.1	1.1X10 <sup>3</sup>	2.9X10 <sup>4</sup>
Cf-254		1.0X10 <sup>-3</sup>	2.7X10 <sup>-2</sup>	1.0X10 <sup>-3</sup>	2.7X10 <sup>-2</sup>	3.1X10 <sup>2</sup>	8.5X10 <sup>3</sup>
Cl-36	Chlorine (17)	1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	1.2X10 <sup>-3</sup>	3.3X10 <sup>-2</sup>
Cl-38		2.0X10 <sup>-1</sup>	5.4	2.0X10 <sup>-1</sup>	5.4	4.9X10 <sup>6</sup>	1.3X10 <sup>8</sup>
Cm-240	Curium (96)	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	2.0X10 <sup>-2</sup>	5.4X10 <sup>-1</sup>	7.5X10 <sup>2</sup>	2.0X10 <sup>4</sup>
Cm-241		2.0	5.4X10 <sup>1</sup>	1.0	2.7X10 <sup>1</sup>	6.1X10 <sup>2</sup>	1.7X10 <sup>4</sup>
Cm-242		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	1.0X10 <sup>-2</sup>	2.7X10 <sup>-1</sup>	1.2X10 <sup>2</sup>	3.3X10 <sup>3</sup>
Cm-243		9.0	2.4X10 <sup>2</sup>	1.0X10 <sup>-3</sup>	2.7X10 <sup>-2</sup>	1.9X10 <sup>-3</sup>	5.2X10 <sup>1</sup>
Cm-244		2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	2.0X10 <sup>-3</sup>	5.4X10 <sup>-2</sup>	3.0	8.1X10 <sup>1</sup>
Cm-245		9.0	2.4X10 <sup>2</sup>	9.0X10 <sup>-4</sup>	2.4X10 <sup>-2</sup>	6.4X10 <sup>-3</sup>	1.7X10 <sup>-1</sup>
Cm-246		9.0	2.4X10 <sup>2</sup>	9.0X10 <sup>-4</sup>	2.4X10 <sup>-2</sup>	1.1X10 <sup>-2</sup>	3.1X10 <sup>-1</sup>
Cm-247 (a)		3.0	8.1X10 <sup>1</sup>	1.0X10 <sup>-3</sup>	2.7X10 <sup>-2</sup>	3.4X10 <sup>-6</sup>	9.3X10 <sup>-5</sup>
Cm-248		2.0X10 <sup>-2</sup>	5.4X10 <sup>-1</sup>	3.0X10 <sup>-4</sup>	8.1X10 <sup>-3</sup>	1.6X10 <sup>-4</sup>	4.2X10 <sup>-3</sup>
Co-55	Cobalt (27)	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	1.1X10 <sup>5</sup>	3.1X10 <sup>6</sup>
Co-56		3.0X10 <sup>-1</sup>	8.1	3.0X10 <sup>-1</sup>	8.1	1.1X10 <sup>3</sup>	3.0X10 <sup>4</sup>
Co-57		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	3.1X10 <sup>2</sup>	8.4X10 <sup>3</sup>
Co-58		1.0	2.7X10 <sup>1</sup>	1.0	2.7X10 <sup>1</sup>	1.2X10 <sup>3</sup>	3.2X10 <sup>4</sup>
Co-58m		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	2.2X10 <sup>5</sup>	5.9X10 <sup>6</sup>
Co-60		4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.2X10 <sup>1</sup>	1.1X10 <sup>3</sup>



Figure: 25 TAC §289.257(ee)(6)

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
Cr-51	Chromium (24)	3.0X10 <sup>1</sup>	8.1X10 <sup>2</sup>	3.0X10 <sup>1</sup>	8.1X10 <sup>2</sup>	3.4X10 <sup>3</sup>	9.2X10 <sup>4</sup>
Cs-129	Cesium (55)	4.0	1.1X10 <sup>2</sup>	4.0	1.1X10 <sup>2</sup>	2.8X10 <sup>4</sup>	7.6X10 <sup>5</sup>
Cs-131		3.0X10 <sup>1</sup>	8.1X10 <sup>2</sup>	3.0X10 <sup>1</sup>	8.1X10 <sup>2</sup>	3.8X10 <sup>3</sup>	1.0X10 <sup>5</sup>
Cs-132		1.0	2.7X10 <sup>1</sup>	1.0	2.7X10 <sup>1</sup>	5.7X10 <sup>3</sup>	1.5X10 <sup>5</sup>
Cs-134		7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	4.8X10 <sup>1</sup>	1.3X10 <sup>3</sup>
Cs-134m		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	3.0X10 <sup>5</sup>	8.0X10 <sup>6</sup>
Cs-135		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	1.0	2.7X10 <sup>1</sup>	4.3X10 <sup>-5</sup>	1.2X10 <sup>-3</sup>
Cs-136		5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	2.7X10 <sup>3</sup>	7.3X10 <sup>4</sup>
Cs-137 (a)		2.0	5.4X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	3.2	8.7X10 <sup>1</sup>
Cu-64	Copper (29)	6.0	1.6X10 <sup>2</sup>	1.0	2.7X10 <sup>1</sup>	1.4X10 <sup>5</sup>	3.9X10 <sup>6</sup>
Cu-67		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	2.8X10 <sup>4</sup>	7.6X10 <sup>5</sup>
Dy-159	Dysprosium (66)	2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	2.1X10 <sup>2</sup>	5.7X10 <sup>3</sup>
Dy-165		9.0X10 <sup>-1</sup>	2.4X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	3.0X10 <sup>5</sup>	8.2X10 <sup>6</sup>
Dy-166 (a)		9.0X10 <sup>-1</sup>	2.4X10 <sup>1</sup>	3.0X10 <sup>-1</sup>	8.1	8.6X10 <sup>3</sup>	2.3X10 <sup>5</sup>
Er-169	Erbium (68)	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	1.0	2.7X10 <sup>1</sup>	3.1X10 <sup>3</sup>	8.3X10 <sup>4</sup>
Er-171		8.0X10 <sup>-1</sup>	2.2X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	9.0X10 <sup>4</sup>	2.4X10 <sup>6</sup>
Eu-147	Europium (63)	2.0	5.4X10 <sup>1</sup>	2.0	5.4X10 <sup>1</sup>	1.4X10 <sup>3</sup>	3.7X10 <sup>4</sup>
Eu-148		5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	6.0X10 <sup>2</sup>	1.6X10 <sup>4</sup>
Eu-149		2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	3.5X10 <sup>2</sup>	9.4X10 <sup>3</sup>
Eu-150 (short lived)		2.0	5.4X10 <sup>1</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	6.1X10 <sup>4</sup>	1.6X10 <sup>6</sup>

Figure: 25 TAC §289.257(ee)(6)

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
Eu-150 (long lived)		7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	6.1X10 <sup>4</sup>	1.6X10 <sup>6</sup>
Eu-152		1.0	2.7X10 <sup>1</sup>	1.0	2.7X10 <sup>1</sup>	6.5	1.8X10 <sup>2</sup>
Eu-152m		8.0X10 <sup>-1</sup>	2.2X10 <sup>1</sup>	8.0X10 <sup>-1</sup>	2.2X10 <sup>1</sup>	8.2X10 <sup>4</sup>	2.2X10 <sup>6</sup>
Eu-154		9.0X10 <sup>-1</sup>	2.4X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	9.8	2.6X10 <sup>2</sup>
Eu-155		2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	3.0	8.1X10 <sup>1</sup>	1.8X10 <sup>1</sup>	4.9X10 <sup>2</sup>
Eu-156		7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	2.0X10 <sup>3</sup>	5.5X10 <sup>4</sup>
F-18	Fluorine (9)	1.0	2.7X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	3.5X10 <sup>6</sup>	9.5X10 <sup>7</sup>
Fe-52 (a)	Iron (26)	3.0X10 <sup>-1</sup>	8.1	3.0X10 <sup>-1</sup>	8.1	2.7X10 <sup>5</sup>	7.3X10 <sup>6</sup>
Fe-55		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	8.8X10 <sup>1</sup>	2.4X10 <sup>3</sup>
Fe-59		9.0X10 <sup>-1</sup>	2.4X10 <sup>1</sup>	9.0X10 <sup>-1</sup>	2.4X10 <sup>1</sup>	1.8X10 <sup>3</sup>	5.0X10 <sup>4</sup>
Fe-60 (a)		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	2.0X10 <sup>-1</sup>	5.4	7.4X10 <sup>-4</sup>	2.0X10 <sup>-2</sup>
Ga-67	Gallium (31)	7.0	1.9X10 <sup>2</sup>	3.0	8.1X10 <sup>1</sup>	2.2X10 <sup>4</sup>	6.0X10 <sup>5</sup>
Ga-68		5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	1.5X10 <sup>6</sup>	4.1X10 <sup>7</sup>
Ga-72		4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	1.1X10 <sup>5</sup>	3.1X10 <sup>6</sup>
Gd-146 (a)	Gadolinium (64)	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	6.9X10 <sup>2</sup>	1.9X10 <sup>4</sup>
Gd-148		2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	2.0X10 <sup>-3</sup>	5.4X10 <sup>-2</sup>	1.2	3.2X10 <sup>1</sup>
Gd-153		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	9.0	2.4X10 <sup>2</sup>	1.3X10 <sup>2</sup>	3.5X10 <sup>3</sup>
Gd-159		3.0	8.1X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	3.9X10 <sup>4</sup>	1.1X10 <sup>6</sup>
Ge-68 (a)	Germanium (32)	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	2.6X10 <sup>2</sup>	7.1X10 <sup>3</sup>
Ge-71		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	5.8X10 <sup>3</sup>	1.6X10 <sup>5</sup>

Figure: 25 TAC §289.257(ee)(6)

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
Ge-77		3.0X10 <sup>-1</sup>	8.1	3.0X10 <sup>-1</sup>	8.1	1.3X10 <sup>5</sup>	3.6X10 <sup>6</sup>
Hf-172 (a)	Hafnium (72)	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	4.1X10 <sup>1</sup>	1.1X10 <sup>3</sup>
Hf-175		3.0	8.1X10 <sup>1</sup>	3.0	8.1X10 <sup>1</sup>	3.9X10 <sup>2</sup>	1.1X10 <sup>4</sup>
Hf-181		2.0	5.4X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	6.3X10 <sup>2</sup>	1.7X10 <sup>4</sup>
Hf-182		Unlimited	Unlimited	Unlimited	Unlimited	8.1X10 <sup>-6</sup>	2.2X10 <sup>-4</sup>
Hg-194 (a)	Mercury (80)	1.0	2.7X10 <sup>1</sup>	1.0	2.7X10 <sup>1</sup>	1.3X10 <sup>-1</sup>	3.5
Hg-195m (a)		3.0	8.1X10 <sup>1</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	1.5X10 <sup>4</sup>	4.0X10 <sup>5</sup>
Hg-197		2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	9.2X10 <sup>3</sup>	2.5X10 <sup>5</sup>
Hg-197m		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	2.5X10 <sup>4</sup>	6.7X10 <sup>5</sup>
Hg-203		5.0	1.4X10 <sup>2</sup>	1.0	2.7X10 <sup>1</sup>	5.1X10 <sup>2</sup>	1.4X10 <sup>4</sup>
Ho-166	Holmium (67)	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	2.6X10 <sup>4</sup>	7.0X10 <sup>5</sup>
Ho-166m		6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	6.6X10 <sup>-2</sup>	1.8
I-123	Iodine (53)	6.0	1.6X10 <sup>2</sup>	3.0	8.1X10 <sup>1</sup>	7.1X10 <sup>4</sup>	1.9X10 <sup>6</sup>
I-124		1.0	2.7X10 <sup>1</sup>	1.0	2.7X10 <sup>1</sup>	9.3X10 <sup>3</sup>	2.5X10 <sup>5</sup>
I-125		2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	3.0	8.1X10 <sup>1</sup>	6.4X10 <sup>2</sup>	1.7X10 <sup>4</sup>
I-126		2.0	5.4X10 <sup>1</sup>	1.0	2.7X10 <sup>1</sup>	2.9X10 <sup>3</sup>	8.0X10 <sup>4</sup>
I-129		Unlimited	Unlimited	Unlimited	Unlimited	6.5X10 <sup>-6</sup>	1.8X10 <sup>-4</sup>
I-131		3.0	8.1X10 <sup>1</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	4.6X10 <sup>3</sup>	1.2X10 <sup>5</sup>
I-132		4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	3.8X10 <sup>5</sup>	1.0X10 <sup>7</sup>
I-133		7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	4.2X10 <sup>4</sup>	1.1X10 <sup>6</sup>

Figure: 25 TAC §289.257(ee)(6)

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
I-134		3.0X10 <sup>-1</sup>	8.1	3.0X10 <sup>-1</sup>	8.1	9.9X10 <sup>5</sup>	2.7X10 <sup>7</sup>
I-135 (a)		6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	1.3X10 <sup>5</sup>	3.5X10 <sup>6</sup>
In-111	Indium (49)	3.0	8.1X10 <sup>1</sup>	3.0	8.1X10 <sup>1</sup>	1.5X10 <sup>4</sup>	4.2X10 <sup>5</sup>
In-113m		4.0	1.1X10 <sup>2</sup>	2.0	5.4X10 <sup>1</sup>	6.2X10 <sup>5</sup>	1.7X10 <sup>7</sup>
In-114m (a)		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	8.6X10 <sup>2</sup>	2.3X10 <sup>4</sup>
In-115m		7.0	1.9X10 <sup>2</sup>	1.0	2.7X10 <sup>1</sup>	2.2X10 <sup>5</sup>	6.1X10 <sup>6</sup>
Ir-189 (a)	Iridium (77)	1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	1.9X10 <sup>3</sup>	5.2X10 <sup>4</sup>
Ir-190		7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	2.3X10 <sup>3</sup>	6.2X10 <sup>4</sup>
Ir-192 (c)		1.0	2.7X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	3.4X10 <sup>2</sup>	9.2X10 <sup>3</sup>
Ir-194		3.0X10 <sup>-1</sup>	8.1	3.0X10 <sup>-1</sup>	8.1	3.1X10 <sup>4</sup>	8.4X10 <sup>5</sup>
K-40	Potassium (19)	9.0X10 <sup>-1</sup>	2.4X10 <sup>1</sup>	9.0X10 <sup>-1</sup>	2.4X10 <sup>1</sup>	2.4X10 <sup>-7</sup>	6.4X10 <sup>-6</sup>
K-42		2.0X10 <sup>-1</sup>	5.4	2.0X10 <sup>-1</sup>	5.4	2.2X10 <sup>5</sup>	6.0X10 <sup>6</sup>
K-43		7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	1.2X10 <sup>5</sup>	3.3X10 <sup>6</sup>
Kr-81	Krypton (36)	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	7.8X10 <sup>-4</sup>	2.1X10 <sup>-2</sup>
Kr-85		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	1.5X10 <sup>1</sup>	3.9X10 <sup>2</sup>
Kr-85m		8.0	2.2X10 <sup>2</sup>	3.0	8.1X10 <sup>1</sup>	3.0X10 <sup>5</sup>	8.2X10 <sup>6</sup>
Kr-87		2.0X10 <sup>-1</sup>	5.4	2.0X10 <sup>-1</sup>	5.4	1.0X10 <sup>6</sup>	2.8X10 <sup>7</sup>
La-137	Lanthanum (57)	3.0X10 <sup>1</sup>	8.1X10 <sup>2</sup>	6.0	1.6X10 <sup>2</sup>	1.6X10 <sup>-3</sup>	4.4X10 <sup>-2</sup>
La-140		4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	2.1X10 <sup>4</sup>	5.6X10 <sup>5</sup>
Lu-172	Lutetium (71)	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	4.2X10 <sup>3</sup>	1.1X10 <sup>5</sup>

Figure: 25 TAC §289.257(ee)(6)

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
Lu-173		8.0	2.2X10 <sup>2</sup>	8.0	2.2X10 <sup>2</sup>	5.6X10 <sup>1</sup>	1.5X10 <sup>3</sup>
Lu-174		9.0	2.4X10 <sup>2</sup>	9.0	2.4X10 <sup>2</sup>	2.3X10 <sup>1</sup>	6.2X10 <sup>2</sup>
Lu-174m		2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	2.0X10 <sup>2</sup>	5.3X10 <sup>3</sup>
Lu-177		3.0X10 <sup>1</sup>	8.1X10 <sup>2</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	4.1X10 <sup>3</sup>	1.1X10 <sup>5</sup>
Mg-28 (a)	Magnesium (12)	3.0X10 <sup>-1</sup>	8.1	3.0X10 <sup>-1</sup>	8.1	2.0X10 <sup>5</sup>	5.4X10 <sup>6</sup>
Mn-52	Manganese (25)	3.0X10 <sup>-1</sup>	8.1	3.0X10 <sup>-1</sup>	8.1	1.6X10 <sup>4</sup>	4.4X10 <sup>5</sup>
Mn-53		Unlimited	Unlimited	Unlimited	Unlimited	6.8X10 <sup>-5</sup>	1.8X10 <sup>-3</sup>
Mn-54		1.0	2.7X10 <sup>1</sup>	1.0	2.7X10 <sup>1</sup>	2.9X10 <sup>2</sup>	7.7X10 <sup>3</sup>
Mn-56		3.0X10 <sup>-1</sup>	8.1	3.0X10 <sup>-1</sup>	8.1	8.0X10 <sup>5</sup>	2.2X10 <sup>7</sup>
Mo-93	Molybdenum (42)	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	4.1X10 <sup>-2</sup>	1.1
Mo-99 (a) (i)		1.0	2.7X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	1.8X10 <sup>4</sup>	4.8X10 <sup>5</sup>
N-13	Nitrogen (7)	9.0X10 <sup>-1</sup>	2.4X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	5.4X10 <sup>7</sup>	1.5X10 <sup>9</sup>
Na-22	Sodium (11)	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	2.3X10 <sup>2</sup>	6.3X10 <sup>3</sup>
Na-24		2.0X10 <sup>-1</sup>	5.4	2.0X10 <sup>-1</sup>	5.4	3.2X10 <sup>5</sup>	8.7X10 <sup>6</sup>
Nb-93m	Niobium (41)	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	3.0X10 <sup>1</sup>	8.1X10 <sup>2</sup>	8.8	2.4X10 <sup>2</sup>
Nb-94		7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	6.9X10 <sup>-3</sup>	1.9X10 <sup>-1</sup>
Nb-95		1.0	2.7X10 <sup>1</sup>	1.0	2.7X10 <sup>1</sup>	1.5X10 <sup>3</sup>	3.9X10 <sup>4</sup>
Nb-97		9.0X10 <sup>-1</sup>	2.4X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	9.9X10 <sup>5</sup>	2.7X10 <sup>7</sup>
Nd-147	Neodymium (60)	6.0	1.6X10 <sup>2</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	3.0X10 <sup>3</sup>	8.1X10 <sup>4</sup>
Nd-149		6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	4.5X10 <sup>5</sup>	1.2X10 <sup>7</sup>

Figure: 25 TAC §289.257(ee)(6)

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
Ni-59	Nickel (28)	Unlimited	Unlimited	Unlimited	Unlimited	3.0X10 <sup>-3</sup>	8.0X10 <sup>-2</sup>
Ni-63		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	3.0X10 <sup>1</sup>	8.1X10 <sup>2</sup>	2.1	5.7X10 <sup>1</sup>
Ni-65		4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	7.1X10 <sup>5</sup>	1.9X10 <sup>7</sup>
Np-235	Neptunium (93)	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	5.2X10 <sup>1</sup>	1.4X10 <sup>3</sup>
Np-236 (short-lived)		2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	2.0	5.4X10 <sup>1</sup>	4.7X10 <sup>-4</sup>	1.3X10 <sup>-2</sup>
Np-236 (long-lived)		9.0X10 <sup>0</sup>	2.4X10 <sup>2</sup>	2.0X10 <sup>-2</sup>	5.4X10 <sup>-1</sup>	4.7X10 <sup>-4</sup>	1.3X10 <sup>-2</sup>
Np-237		2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	2.0X10 <sup>-3</sup>	5.4X10 <sup>-2</sup>	2.6X10 <sup>-5</sup>	7.1X10 <sup>-4</sup>
Np-239		7.0	1.9X10 <sup>2</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	8.6X10 <sup>3</sup>	2.3X10 <sup>5</sup>
Os-185	Osmium (76)	1.0	2.7X10 <sup>1</sup>	1.0	2.7X10 <sup>1</sup>	2.8X10 <sup>2</sup>	7.5X10 <sup>3</sup>
Os-191		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	2.0	5.4X10 <sup>1</sup>	1.6X10 <sup>3</sup>	4.4X10 <sup>4</sup>
Os-191m		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	3.0X10 <sup>1</sup>	8.1X10 <sup>2</sup>	4.6X10 <sup>4</sup>	1.3X10 <sup>6</sup>
Os-193		2.0	5.4X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	2.0X10 <sup>4</sup>	5.3X10 <sup>5</sup>
Os-194 (a)		3.0X10 <sup>-1</sup>	8.1	3.0X10 <sup>-1</sup>	8.1	1.1X10 <sup>1</sup>	3.1X10 <sup>2</sup>
P-32	Phosphorus (15)	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	1.1X10 <sup>4</sup>	2.9X10 <sup>5</sup>
P-33		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	1.0	2.7X10 <sup>1</sup>	5.8X10 <sup>3</sup>	1.6X10 <sup>5</sup>
Pa-230 (a)	Protactinium (91)	2.0	5.4X10 <sup>1</sup>	7.0X10 <sup>-2</sup>	1.9	1.2X10 <sup>3</sup>	3.3X10 <sup>4</sup>
Pa-231		4.0	1.1X10 <sup>2</sup>	4.0X10 <sup>-4</sup>	1.1X10 <sup>-2</sup>	1.7X10 <sup>-3</sup>	4.7X10 <sup>-2</sup>
Pa-233		5.0	1.4X10 <sup>2</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	7.7X10 <sup>2</sup>	2.1X10 <sup>4</sup>
Pb-201	Lead (82)	1.0	2.7X10 <sup>1</sup>	1.0	2.7X10 <sup>1</sup>	6.2X10 <sup>4</sup>	1.7X10 <sup>6</sup>
Pb-202		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	1.2X10 <sup>-4</sup>	3.4X10 <sup>-3</sup>

Figure: 25 TAC §289.257(ee)(6)

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
Pb-203		4.0	1.1X10 <sup>2</sup>	3.0	8.1X10 <sup>1</sup>	1.1X10 <sup>4</sup>	3.0X10 <sup>5</sup>
Pb-205		Unlimited	Unlimited	Unlimited	Unlimited	4.5X10 <sup>-6</sup>	1.2X10 <sup>-4</sup>
Pb-210 (a)		1.0	2.7X10 <sup>1</sup>	5.0X10 <sup>-2</sup>	1.4	2.8	7.6X10 <sup>1</sup>
Pb-212 (a)		7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	2.0X10 <sup>-1</sup>	5.4	5.1X10 <sup>4</sup>	1.4X10 <sup>6</sup>
Pd-103 (a)	Palladium (46)	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	2.8X10 <sup>3</sup>	7.5X10 <sup>4</sup>
Pd-107		Unlimited	Unlimited	Unlimited	Unlimited	1.9X10 <sup>-5</sup>	5.1X10 <sup>-4</sup>
Pd-109		2.0	5.4X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	7.9X10 <sup>4</sup>	2.1X10 <sup>6</sup>
Pm-143	Promethium (61)	3.0	8.1X10 <sup>1</sup>	3.0	8.1X10 <sup>1</sup>	1.3X10 <sup>2</sup>	3.4X10 <sup>3</sup>
Pm-144		7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	9.2X10 <sup>1</sup>	2.5X10 <sup>3</sup>
Pm-145		3.0X10 <sup>1</sup>	8.1X10 <sup>2</sup>	1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	5.2	1.4X10 <sup>2</sup>
Pm-147		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	2.0	5.4X10 <sup>1</sup>	3.4X10 <sup>1</sup>	9.3X10 <sup>2</sup>
Pm-148m (a)		8.0X10 <sup>-1</sup>	2.2X10 <sup>1</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	7.9X10 <sup>2</sup>	2.1X10 <sup>4</sup>
Pm-149		2.0	5.4X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	1.5X10 <sup>4</sup>	4.0X10 <sup>5</sup>
Pm-151		2.0	5.4X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	2.7X10 <sup>4</sup>	7.3X10 <sup>5</sup>
Po-210	Polonium (84)	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	2.0X10 <sup>-2</sup>	5.4X10 <sup>-1</sup>	1.7X10 <sup>2</sup>	4.5X10 <sup>3</sup>
Pr-142	Praseodymium (59)	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.3X10 <sup>4</sup>	1.2X10 <sup>6</sup>
Pr-143		3.0	8.1X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	2.5X10 <sup>3</sup>	6.7X10 <sup>4</sup>
Pt-188 (a)	Platinum (78)	1.0	2.7X10 <sup>1</sup>	8.0X10 <sup>-1</sup>	2.2X10 <sup>1</sup>	2.5X10 <sup>3</sup>	6.8X10 <sup>4</sup>
Pt-191		4.0	1.1X10 <sup>2</sup>	3.0	8.1X10 <sup>1</sup>	8.7X10 <sup>3</sup>	2.4X10 <sup>5</sup>
Pt-193		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	1.4	3.7X10 <sup>1</sup>

Figure: 25 TAC §289.257(ee)(6)

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
Pt-193m		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	5.8X10 <sup>3</sup>	1.6X10 <sup>5</sup>
Pt-195m		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	6.2X10 <sup>3</sup>	1.7X10 <sup>5</sup>
Pt-197		2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	3.2X10 <sup>4</sup>	8.7X10 <sup>5</sup>
Pt-197m		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	3.7X10 <sup>5</sup>	1.0X10 <sup>7</sup>
Pu-236	Plutonium (94)	3.0X10 <sup>1</sup>	8.1X10 <sup>2</sup>	3.0X10 <sup>-3</sup>	8.1X10 <sup>-2</sup>	2.0X10 <sup>1</sup>	5.3X10 <sup>2</sup>
Pu-237		2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	4.5X10 <sup>2</sup>	1.2X10 <sup>4</sup>
Pu-238		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	1.0X10 <sup>-3</sup>	2.7X10 <sup>-2</sup>	6.3X10 <sup>-1</sup>	1.7X10 <sup>1</sup>
Pu-239		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	1.0X10 <sup>-3</sup>	2.7X10 <sup>-2</sup>	2.3X10 <sup>-3</sup>	6.2X10 <sup>-2</sup>
Pu-240		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	1.0X10 <sup>-3</sup>	2.7X10 <sup>-2</sup>	8.4X10 <sup>-3</sup>	2.3X10 <sup>-1</sup>
Pu-241 (a)		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	6.0X10 <sup>-2</sup>	1.6	3.8	1.0X10 <sup>2</sup>
Pu-242		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	1.0X10 <sup>-3</sup>	2.7X10 <sup>-2</sup>	1.5X10 <sup>-4</sup>	3.9X10 <sup>-3</sup>
Pu-244 (a)		4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	1.0X10 <sup>-3</sup>	2.7X10 <sup>-2</sup>	6.7X10 <sup>-7</sup>	1.8X10 <sup>-5</sup>
Ra-223 (a)	Radium (88)	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	7.0X10 <sup>-3</sup>	1.9X10 <sup>-1</sup>	1.9X10 <sup>3</sup>	5.1X10 <sup>4</sup>
Ra-224 (a)		4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	2.0X10 <sup>-2</sup>	5.4X10 <sup>-1</sup>	5.9X10 <sup>3</sup>	1.6X10 <sup>5</sup>
Ra-225 (a)		2.0X10 <sup>-1</sup>	5.4	4.0X10 <sup>-3</sup>	1.1X10 <sup>-1</sup>	1.5X10 <sup>3</sup>	3.9X10 <sup>4</sup>
Ra-226 (a)		2.0X10 <sup>-1</sup>	5.4	3.0X10 <sup>-3</sup>	8.1X10 <sup>-2</sup>	3.7X10 <sup>-2</sup>	1.0
Ra-228 (a)		6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	2.0X10 <sup>-2</sup>	5.4X10 <sup>-1</sup>	1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>
Rb-81	Rubidium (37)	2.0	5.4X10 <sup>1</sup>	8.0X10 <sup>-1</sup>	2.2X10 <sup>1</sup>	3.1X10 <sup>5</sup>	8.4X10 <sup>6</sup>
Rb-83 (a)		2.0	5.4X10 <sup>1</sup>	2.0	5.4X10 <sup>1</sup>	6.8X10 <sup>2</sup>	1.8X10 <sup>4</sup>
Rb-84		1.0	2.7X10 <sup>1</sup>	1.0	2.7X10 <sup>1</sup>	1.8X10 <sup>3</sup>	4.7X10 <sup>4</sup>



Figure: 25 TAC §289.257(ee)(6)

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
Rb-86		5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	3.0X10 <sup>3</sup>	8.1X10 <sup>4</sup>
Rb-87		Unlimited	Unlimited	Unlimited	Unlimited	3.2X10 <sup>-9</sup>	8.6X10 <sup>-8</sup>
Rb(nat)		Unlimited	Unlimited	Unlimited	Unlimited	6.7X10 <sup>6</sup>	1.8X10 <sup>8</sup>
Re-184	Rhenium (75)	1.0	2.7X10 <sup>1</sup>	1.0	2.7X10 <sup>1</sup>	6.9X10 <sup>2</sup>	1.9X10 <sup>4</sup>
Re-184m		3.0	8.1X10 <sup>1</sup>	1.0	2.7X10 <sup>1</sup>	1.6X10 <sup>2</sup>	4.3X10 <sup>3</sup>
Re-186		2.0	5.4X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	6.9X10 <sup>3</sup>	1.9X10 <sup>5</sup>
Re-187		Unlimited	Unlimited	Unlimited	Unlimited	1.4X10 <sup>-9</sup>	3.8X10 <sup>-8</sup>
Re-188		4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	3.6X10 <sup>4</sup>	9.8X10 <sup>5</sup>
Re-189 (a)		3.0	8.1X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	2.5X10 <sup>4</sup>	6.8X10 <sup>5</sup>
Re(nat)		Unlimited	Unlimited	Unlimited	Unlimited	0.0	2.4X10 <sup>-8</sup>
Rh-99	Rhodium (45)	2.0	5.4X10 <sup>1</sup>	2.0	5.4X10 <sup>1</sup>	3.0X10 <sup>3</sup>	8.2X10 <sup>4</sup>
Rh-101		4.0	1.1X10 <sup>2</sup>	3.0	8.1X10 <sup>1</sup>	4.1X10 <sup>1</sup>	1.1X10 <sup>3</sup>
Rh-102		5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	4.5X10 <sup>1</sup>	1.2X10 <sup>3</sup>
Rh-102m		2.0	5.4X10 <sup>1</sup>	2.0	5.4X10 <sup>1</sup>	2.3X10 <sup>2</sup>	6.2X10 <sup>3</sup>
Rh-103m		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	1.2X10 <sup>6</sup>	3.3X10 <sup>7</sup>
Rh-105		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	8.0X10 <sup>-1</sup>	2.2X10 <sup>1</sup>	3.1X10 <sup>4</sup>	8.4X10 <sup>5</sup>
Rn-222 (a)	Radon (86)	3.0X10 <sup>-1</sup>	8.1	4.0X10 <sup>-3</sup>	1.1X10 <sup>-1</sup>	5.7X10 <sup>3</sup>	1.5X10 <sup>5</sup>
Ru-97	Ruthenium (44)	5.0	1.4X10 <sup>2</sup>	5.0	1.4X10 <sup>2</sup>	1.7X10 <sup>4</sup>	4.6X10 <sup>5</sup>
Ru-103 (a)		2.0	5.4X10 <sup>1</sup>	2.0	5.4X10 <sup>1</sup>	1.2X10 <sup>3</sup>	3.2X10 <sup>4</sup>
Ru-105		1.0	2.7X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	2.5X10 <sup>5</sup>	6.7X10 <sup>6</sup>

Figure: 25 TAC §289.257(ee)(6)

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
Ru-106 (a)		2.0X10 <sup>-1</sup>	5.4	2.0X10 <sup>-1</sup>	5.4	1.2X10 <sup>2</sup>	3.3X10 <sup>3</sup>
S-35	Sulphur (16)	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	3.0	8.1X10 <sup>1</sup>	1.6X10 <sup>3</sup>	4.3X10 <sup>4</sup>
Sb-122	Antimony (51)	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	1.5X10 <sup>4</sup>	4.0X10 <sup>5</sup>
Sb-124		6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	6.5X10 <sup>2</sup>	1.7X10 <sup>4</sup>
Sb-125		2.0	5.4X10 <sup>1</sup>	1.0	2.7X10 <sup>1</sup>	3.9X10 <sup>1</sup>	1.0X10 <sup>3</sup>
Sb-126		4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	3.1X10 <sup>3</sup>	8.4X10 <sup>4</sup>
Sc-44	Scandium (21)	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	6.7X10 <sup>5</sup>	1.8X10 <sup>7</sup>
Sc-46		5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	1.3X10 <sup>3</sup>	3.4X10 <sup>4</sup>
Sc-47		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	3.1X10 <sup>4</sup>	8.3X10 <sup>5</sup>
Sc-48		3.0X10 <sup>-1</sup>	8.1	3.0X10 <sup>-1</sup>	8.1	5.5X10 <sup>4</sup>	1.5X10 <sup>6</sup>
Se-75	Selenium (34)	3.0	8.1X10 <sup>1</sup>	3.0	8.1X10 <sup>1</sup>	5.4X10 <sup>2</sup>	1.5X10 <sup>4</sup>
Se-79		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	2.0	5.4X10 <sup>1</sup>	2.6X10 <sup>-3</sup>	7.0X10 <sup>-2</sup>
Si-31	Silicon (14)	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	1.4X10 <sup>6</sup>	3.9X10 <sup>7</sup>
Si-32		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	3.9	1.1X10 <sup>2</sup>
Sm-145	Samarium (62)	1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	9.8X10 <sup>1</sup>	2.6X10 <sup>3</sup>
Sm-147		Unlimited	Unlimited	Unlimited	Unlimited	8.5X10 <sup>-1</sup>	2.3X10 <sup>-8</sup>
Sm-151		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	9.7X10 <sup>-1</sup>	2.6X10 <sup>1</sup>
Sm-153		9.0	2.4X10 <sup>2</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	1.6X10 <sup>4</sup>	4.4X10 <sup>5</sup>
Sn-113 (a)	Tin (50)	4.0	1.1X10 <sup>2</sup>	2.0	5.4X10 <sup>1</sup>	3.7X10 <sup>2</sup>	1.0X10 <sup>4</sup>
Sn-117m		7.0	1.9X10 <sup>2</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	3.0X10 <sup>3</sup>	8.2X10 <sup>4</sup>

Figure: 25 TAC §289.257(ee)(6)

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
Sn-119m		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	3.0X10 <sup>1</sup>	8.1X10 <sup>2</sup>	1.4X10 <sup>2</sup>	3.7X10 <sup>3</sup>
Sn-121m (a)		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	9.0X10 <sup>-1</sup>	2.4X10 <sup>1</sup>	2.0	5.4X10 <sup>1</sup>
Sn-123		8.0X10 <sup>-1</sup>	2.2X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	3.0X10 <sup>2</sup>	8.2X10 <sup>3</sup>
Sn-125		4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>3</sup>	1.1X10 <sup>5</sup>
Sn-126 (a)		6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	1.0X10 <sup>-3</sup>	2.8X10 <sup>-2</sup>
Sr-82 (a)	Strontium (38)	2.0X10 <sup>-1</sup>	5.4	2.0X10 <sup>-1</sup>	5.4	2.3X10 <sup>3</sup>	6.2X10 <sup>4</sup>
Sr-85		2.0	5.4X10 <sup>1</sup>	2.0	5.4X10 <sup>1</sup>	8.8X10 <sup>2</sup>	2.4X10 <sup>4</sup>
Sr-85m		5.0	1.4X10 <sup>2</sup>	5.0	1.4X10 <sup>2</sup>	1.2X10 <sup>6</sup>	3.3X10 <sup>7</sup>
Sr-87m		3.0	8.1X10 <sup>1</sup>	3.0	8.1X10 <sup>1</sup>	4.8X10 <sup>5</sup>	1.3X10 <sup>7</sup>
Sr-89		6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	1.1X10 <sup>3</sup>	2.9X10 <sup>4</sup>
Sr-90 (a)		3.0X10 <sup>-1</sup>	8.1	3.0X10 <sup>-1</sup>	8.1	5.1	1.4X10 <sup>2</sup>
Sr-91 (a)		3.0X10 <sup>-1</sup>	8.1	3.0X10 <sup>-1</sup>	8.1	1.3X10 <sup>5</sup>	3.6X10 <sup>6</sup>
Sr-92 (a)		1.0	2.7X10 <sup>1</sup>	3.0X10 <sup>-1</sup>	8.1	4.7X10 <sup>5</sup>	1.3X10 <sup>7</sup>
T(H-3)	Tritium (1)	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	3.6X10 <sup>2</sup>	9.7X10 <sup>3</sup>
Ta-178 (long-lived)	Tantalum (73)	1.0	2.7X10 <sup>1</sup>	8.0X10 <sup>-1</sup>	2.2X10 <sup>1</sup>	4.2X10 <sup>6</sup>	1.1X10 <sup>8</sup>
Ta-179		3.0X10 <sup>1</sup>	8.1X10 <sup>2</sup>	3.0X10 <sup>1</sup>	8.1X10 <sup>2</sup>	4.1X10 <sup>1</sup>	1.1X10 <sup>3</sup>
Ta-182		9.0X10 <sup>-1</sup>	2.4X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	2.3X10 <sup>2</sup>	6.2X10 <sup>3</sup>
Tb-157	Terbium (65)	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	5.6X10 <sup>-1</sup>	1.5X10 <sup>1</sup>
Tb-158		1.0	2.7X10 <sup>1</sup>	1.0	2.7X10 <sup>1</sup>	5.6X10 <sup>-1</sup>	1.5X10 <sup>1</sup>
Tb-160		1.0	2.7X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	4.2X10 <sup>2</sup>	1.1X10 <sup>4</sup>

Figure: 25 TAC §289.257(ee)(6)

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
Tc-95m (a)	Technetium (43)	2.0	5.4X10 <sup>1</sup>	2.0	5.4X10 <sup>1</sup>	8.3X10 <sup>2</sup>	2.2X10 <sup>4</sup>
Tc-96		4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	1.2X10 <sup>4</sup>	3.2X10 <sup>5</sup>
Tc-96m (a)		4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	1.4X10 <sup>6</sup>	3.8X10 <sup>7</sup>
Tc-97		Unlimited	Unlimited	Unlimited	Unlimited	5.2X10 <sup>-5</sup>	1.4X10 <sup>-3</sup>
Tc-97m		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	1.0	2.7X10 <sup>1</sup>	5.6X10 <sup>2</sup>	1.5X10 <sup>4</sup>
Tc-98		8.0X10 <sup>-1</sup>	2.2X10 <sup>1</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	3.2X10 <sup>-5</sup>	8.7X10 <sup>-4</sup>
Tc-99		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	9.0X10 <sup>-1</sup>	2.4X10 <sup>1</sup>	6.3X10 <sup>-4</sup>	1.7X10 <sup>-2</sup>
Tc-99m		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	4.0	1.1X10 <sup>2</sup>	1.9X10 <sup>5</sup>	5.3X10 <sup>6</sup>
Te-121	Tellurium (52)	2.0	5.4X10 <sup>1</sup>	2.0	5.4X10 <sup>1</sup>	2.4X10 <sup>3</sup>	6.4X10 <sup>4</sup>
Te-121m		5.0	1.4X10 <sup>2</sup>	3.0	8.1X10 <sup>1</sup>	2.6X10 <sup>2</sup>	7.0X10 <sup>3</sup>
Te-123m		8.0	2.2X10 <sup>2</sup>	1.0	2.7X10 <sup>1</sup>	3.3X10 <sup>2</sup>	8.9X10 <sup>3</sup>
Te-125m		2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	9.0X10 <sup>-1</sup>	2.4X10 <sup>1</sup>	6.7X10 <sup>2</sup>	1.8X10 <sup>4</sup>
Te-127		2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	9.8X10 <sup>4</sup>	2.6X10 <sup>6</sup>
Te-127m (a)		2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	3.5X10 <sup>2</sup>	9.4X10 <sup>3</sup>
Te-129		7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	7.7X10 <sup>5</sup>	2.1X10 <sup>7</sup>
Te-129m (a)		8.0X10 <sup>-1</sup>	2.2X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	1.1X10 <sup>3</sup>	3.0X10 <sup>4</sup>
Te-131m (a)		7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	3.0X10 <sup>4</sup>	8.0X10 <sup>5</sup>
Te-132 (a)		5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	3.1X10 <sup>4</sup>	3.0X10 <sup>5</sup>
Th-227	Thorium (90)	1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	5.0X10 <sup>-3</sup>	1.4X10 <sup>-1</sup>	1.1X10 <sup>3</sup>	3.1X10 <sup>4</sup>
Th-228 (a)		5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	1.0X10 <sup>-3</sup>	2.7X10 <sup>-2</sup>	3.0X10 <sup>1</sup>	8.2X10 <sup>2</sup>

Figure: 25 TAC §289.257(ee)(6)

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
Th-229		5.0	1.4X10 <sup>2</sup>	5.0X10 <sup>-4</sup>	1.4X10 <sup>-2</sup>	7.9X10 <sup>-3</sup>	2.1X10 <sup>-1</sup>
Th-230		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	1.0X10 <sup>-3</sup>	2.7X10 <sup>-2</sup>	7.6X10 <sup>-4</sup>	2.1X10 <sup>-2</sup>
Th-231		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	2.0X10 <sup>-2</sup>	5.4X10 <sup>-1</sup>	2.0X10 <sup>4</sup>	5.3X10 <sup>5</sup>
Th-232		Unlimited	Unlimited	Unlimited	Unlimited	4.0X10 <sup>-9</sup>	1.1X10 <sup>-7</sup>
Th-234 (a)		3.0X10 <sup>-1</sup>	8.1	3.0X10 <sup>-1</sup>	8.1	8.6X10 <sup>2</sup>	2.3X10 <sup>4</sup>
Th(nat)		Unlimited	Unlimited	Unlimited	Unlimited	8.1X10 <sup>-9</sup>	2.2X10 <sup>-7</sup>
Ti-44 (a)	Titanium (22)	5.0X10 <sup>-1</sup>	1.4X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	6.4	1.7X10 <sup>2</sup>
Tl-200	Thallium (81)	9.0X10 <sup>-1</sup>	2.4X10 <sup>1</sup>	9.0X10 <sup>-1</sup>	2.4X10 <sup>1</sup>	2.2X10 <sup>4</sup>	6.0X10 <sup>5</sup>
Tl-201		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	4.0	1.1X10 <sup>2</sup>	7.9X10 <sup>3</sup>	2.1X10 <sup>5</sup>
Tl-202		2.0	5.4X10 <sup>1</sup>	2.0	5.4X10 <sup>1</sup>	2.0X10 <sup>3</sup>	5.3X10 <sup>4</sup>
Tl-204		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	1.7X10 <sup>1</sup>	4.6X10 <sup>2</sup>
Tm-167	Thulium (69)	7.0	1.9X10 <sup>2</sup>	8.0X10 <sup>-1</sup>	2.2X10 <sup>1</sup>	3.1X10 <sup>3</sup>	8.5X10 <sup>4</sup>
Tm-170		3.0	8.1X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	2.2X10 <sup>2</sup>	6.0X10 <sup>3</sup>
Tm-171		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>
U-230 (fast lung absorption) (a)(d)	Uranium (92)	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	1.0X10 <sup>-1</sup>	2.7	1.0X10 <sup>3</sup>	2.7X10 <sup>4</sup>
U-230 (medium lung absorption) (a)(e)		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	4.0X10 <sup>-3</sup>	1.1X10 <sup>-1</sup>	1.0X10 <sup>3</sup>	2.7X10 <sup>4</sup>
U-230 (slow lung absorption) (a)(f)		3.0X10 <sup>1</sup>	8.1X10 <sup>2</sup>	3.0X10 <sup>-3</sup>	8.1X10 <sup>-2</sup>	1.0X10 <sup>3</sup>	2.7X10 <sup>4</sup>
U-232 (fast lung absorption) (d)		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	1.0X10 <sup>-2</sup>	2.7X10 <sup>-1</sup>	8.3X10 <sup>-1</sup>	2.2X10 <sup>1</sup>

Figure: 25 TAC §289.257(ee)(6)

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
U-232 (medium lung absorption) (e)		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	7.0X10 <sup>-3</sup>	1.9X10 <sup>-1</sup>	8.3X10 <sup>-1</sup>	2.2X10 <sup>1</sup>
U-232 (slow lung absorption) (f)		1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	1.0X10 <sup>-3</sup>	2.7X10 <sup>-2</sup>	8.3X10 <sup>-1</sup>	2.2X10 <sup>1</sup>
U-233 (fast lung absorption) (d)		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	9.0X10 <sup>-2</sup>	2.4	3.6X10 <sup>-4</sup>	9.7X10 <sup>-3</sup>
U-233 (medium lung absorption) (e)		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	2.0X10 <sup>-2</sup>	5.4X10 <sup>-1</sup>	3.6X10 <sup>-4</sup>	9.7X10 <sup>-3</sup>
U-233 (slow lung absorption) (f)		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	6.0X10 <sup>-3</sup>	1.6X10 <sup>-1</sup>	3.6X10 <sup>-4</sup>	9.7X10 <sup>-3</sup>
U-234 (fast lung absorption) (d)		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	9.0X10 <sup>-2</sup>	2.4	2.3X10 <sup>-4</sup>	6.2X10 <sup>-3</sup>
U-234 (medium lung absorption) (e)		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	2.0X10 <sup>-2</sup>	5.4X10 <sup>-1</sup>	2.3X10 <sup>-4</sup>	6.2X10 <sup>-3</sup>
U-234 (slow lung absorption) (f)		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	6.0X10 <sup>-3</sup>	1.6X10 <sup>-1</sup>	2.3X10 <sup>-4</sup>	6.2X10 <sup>-3</sup>
U-235 (all lung absorption types) (a),(d),(e),(f)		Unlimited	Unlimited	Unlimited	Unlimited	8.0X10 <sup>-8</sup>	2.2X10 <sup>-6</sup>
U-236 (fast lung absorption) (d)		Unlimited	Unlimited	Unlimited	Unlimited	2.4X10 <sup>-6</sup>	6.5X10 <sup>-5</sup>
U-236 (medium lung absorption) (e)		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	2.0X10 <sup>-2</sup>	5.4X10 <sup>-1</sup>	2.4X10 <sup>-6</sup>	6.5X10 <sup>-5</sup>
U-236 (slow lung absorption) (f)		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	6.0X10 <sup>-3</sup>	1.6X10 <sup>-1</sup>	2.4X10 <sup>-6</sup>	6.5X10 <sup>-5</sup>

Figure: 25 TAC §289.257(ee)(6)

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
absorption) (f)							
U-238 (all lung absorption types) (d),(e),(f)		Unlimited	Unlimited	Unlimited	Unlimited	1.2X10 <sup>-8</sup>	3.4X10 <sup>-7</sup>
U (nat)		Unlimited	Unlimited	Unlimited	Unlimited	2.6X10 <sup>-8</sup>	7.1X10 <sup>-7</sup>
U (enriched to 20% or less) (g)		Unlimited	Unlimited	Unlimited	Unlimited	See Table 257-6	See Table 257-6
U (dep)		Unlimited	Unlimited	Unlimited	Unlimited	See Table 257-6	(See Table 257-5)
V-48	Vanadium (23)	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	6.3X10 <sup>3</sup>	1.7X10 <sup>5</sup>
V-49		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	3.0X10 <sup>2</sup>	8.1X10 <sup>3</sup>
W-178 (a)	Tungsten (74)	9.0	2.4X10 <sup>2</sup>	5.0	1.4X10 <sup>2</sup>	1.3X10 <sup>3</sup>	3.4X10 <sup>4</sup>
W-181		3.0X10 <sup>1</sup>	8.1X10 <sup>2</sup>	3.0X10 <sup>1</sup>	8.1X10 <sup>2</sup>	2.2X10 <sup>2</sup>	6.0X10 <sup>3</sup>
W-185		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	8.0X10 <sup>-1</sup>	2.2X10 <sup>1</sup>	3.5X10 <sup>2</sup>	9.4X10 <sup>3</sup>
W-187		2.0	5.4X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	2.6X10 <sup>4</sup>	7.0X10 <sup>5</sup>
W-188 (a)		4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	3.0X10 <sup>-1</sup>	8.1	3.7X10 <sup>2</sup>	1.0X10 <sup>4</sup>
Xe-122 (a)	Xenon (54)	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.8X10 <sup>4</sup>	1.3X10 <sup>6</sup>
Xe-123		2.0	5.4X10 <sup>1</sup>	7.0X10 <sup>-1</sup>	1.9X10 <sup>1</sup>	4.4X10 <sup>5</sup>	1.2X10 <sup>7</sup>
Xe-127		4.0	1.1X10 <sup>2</sup>	2.0	5.4X10 <sup>1</sup>	1.0X10 <sup>3</sup>	2.8X10 <sup>4</sup>
Xe-131m		4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	4.0X10 <sup>1</sup>	1.1X10 <sup>3</sup>	3.1X10 <sup>3</sup>	8.4X10 <sup>4</sup>
Xe-133		2.0X10 <sup>1</sup>	5.4X10 <sup>2</sup>	1.0X10 <sup>1</sup>	2.7X10 <sup>2</sup>	6.9X10 <sup>3</sup>	1.9X10 <sup>5</sup>
Xe-135		3.0	8.1X10 <sup>1</sup>	2.0	5.4X10 <sup>1</sup>	9.5X10 <sup>4</sup>	2.6X10 <sup>6</sup>

Figure: 25 TAC §289.257(ee)(6)

Symbol of radionuclide	Element and atomic number	A <sub>1</sub> (TBq)	A <sub>1</sub> (Ci) <sup>b</sup>	A <sub>2</sub> (TBq)	A <sub>2</sub> (Ci) <sup>b</sup>	Specific activity	
						(TBq/g)	(Ci/g)
Y-87 (a)	Yttrium (39)	1.0	2.7X10 <sup>1</sup>	1.0	2.7X10 <sup>1</sup>	1.7X10 <sup>4</sup>	4.5X10 <sup>5</sup>
Y-88		4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	5.2X10 <sup>2</sup>	1.4X10 <sup>4</sup>
Y-90		3.0X10 <sup>-1</sup>	8.1	3.0X10 <sup>-1</sup>	8.1	2.0X10 <sup>4</sup>	5.4X10 <sup>5</sup>
Y-91		6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	9.1X10 <sup>2</sup>	2.5X10 <sup>4</sup>
Y-91m		2.0	5.4X10 <sup>1</sup>	2.0	5.4X10 <sup>1</sup>	1.5X10 <sup>6</sup>	4.2X10 <sup>7</sup>
Y-92		2.0X10 <sup>-1</sup>	5.4	2.0X10 <sup>-1</sup>	5.4	3.6X10 <sup>5</sup>	9.6X10 <sup>6</sup>
Y-93		3.0X10 <sup>-1</sup>	8.1	3.0X10 <sup>-1</sup>	8.1	1.2X10 <sup>5</sup>	3.3X10 <sup>6</sup>
Yb-169	Ytterbium (70)	4.0	1.1X10 <sup>2</sup>	1.0	2.7X10 <sup>1</sup>	8.9X10 <sup>2</sup>	2.4X10 <sup>4</sup>
Yb-175		3.0X10 <sup>1</sup>	8.1X10 <sup>2</sup>	9.0X10 <sup>-1</sup>	2.4X10 <sup>1</sup>	6.6X10 <sup>3</sup>	1.8X10 <sup>5</sup>
Zn-65	Zinc (30)	2.0	5.4X10 <sup>1</sup>	2.0	5.4X10 <sup>1</sup>	3.0X10 <sup>2</sup>	8.2X10 <sup>3</sup>
Zn-69		3.0	8.1X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	1.8X10 <sup>6</sup>	4.9X10 <sup>7</sup>
Zn-69m (a)		3.0	8.1X10 <sup>1</sup>	6.0X10 <sup>-1</sup>	1.6X10 <sup>1</sup>	1.2X10 <sup>5</sup>	3.3X10 <sup>6</sup>
Zr-88	Zirconium (40)	3.0	8.1X10 <sup>1</sup>	3.0	8.1X10 <sup>1</sup>	6.6X10 <sup>2</sup>	1.8X10 <sup>4</sup>
Zr-93		Unlimited	Unlimited	Unlimited	Unlimited	9.3X10 <sup>-5</sup>	2.5X10 <sup>-3</sup>
Zr-95 (a)		2.0	5.4X10 <sup>1</sup>	8.0X10 <sup>-1</sup>	2.2X10 <sup>1</sup>	7.9X10 <sup>2</sup>	2.1X10 <sup>4</sup>
Zr-97 (a)		4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	4.0X10 <sup>-1</sup>	1.1X10 <sup>1</sup>	7.1X10 <sup>4</sup>	1.9X10 <sup>6</sup>

<sup>a</sup> A<sub>1</sub> and/or A<sub>2</sub> values include contributions from daughter nuclides with half-lives less than 10 days.

<sup>b</sup> The values of A<sub>1</sub> and A<sub>2</sub> in Curies (Ci) are approximate and for information only; the regulatory standard units are Terabecquerels (TBq), (subsection (ee)(1) of this section - Determination of A<sub>1</sub> and A<sub>2</sub>, Section I.).

<sup>c</sup> The quantity may be determined from a measurement of the rate of decay or a measurement of the radiation level at a prescribed distance from the source.



Figure: 25 TAC §289.257(ee)(6)

<sup>d</sup> These values apply only to compounds of uranium that take the chemical form of  $\text{UF}_6$ ,  $\text{UO}_2\text{F}_2$  and  $\text{UO}_2(\text{NO}_3)_2$  in both normal and accident conditions of transport.

<sup>e</sup> These values apply only to compounds of uranium that take the chemical form of  $\text{UO}_3$ ,  $\text{UF}_4$ ,  $\text{UCl}_4$  and hexavalent compounds in both normal and accident conditions of transport.

<sup>f</sup> These values apply to all compounds of uranium other than those specified in notes (d) and (e) of this table.

<sup>g</sup> These values apply to unirradiated uranium only.

<sup>h</sup>  $A_1 = 0.1 \text{ TBq (2.7 Ci)}$  and  $A_2 = 0.001 \text{ TBq (0.027 Ci)}$  for Cf-252 for domestic use.

<sup>i</sup>  $A_2 = 0.74 \text{ TBq (20 Ci)}$  for Mo-99 for domestic use.

Table 257-4

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
Ac-225	Actinium (89)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Ac-227		$1.0 \times 10^{-1}$	$2.7 \times 10^{-12}$	$1.0 \times 10^3$	$2.7 \times 10^{-8}$
Ac-228		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Ag-105	Silver (47)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Ag-108m (b)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Ag-110m		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Ag-111		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Al-26	Aluminum (13)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Am-241	Americium (95)	1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Am-242m (b)		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Am-243 (b)		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^3$	$2.7 \times 10^{-8}$
Ar-37	Argon (18)	$1.0 \times 10^6$	$2.7 \times 10^{-5}$	$1.0 \times 10^8$	$2.7 \times 10^{-3}$
Ar-39		$1.0 \times 10^7$	$2.7 \times 10^{-4}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Ar-41		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^9$	$2.7 \times 10^{-2}$
As-72	Arsenic (33)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
As-73		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
As-74		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$

Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
As-76		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
As-77		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
At-211	Astatine (85)	$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Au-193	Gold (79)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Au-194		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Au-195		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Au-198		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Au-199		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Ba-131	Barium (56)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Ba-133		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Ba-133m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Ba-140 (b)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Be-7	Beryllium (4)	$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Be-10		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Bi-205	Bismuth (83)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Bi-206		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Bi-207		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Bi-210		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Bi-210m		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$

Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
Bi-212 (b)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Bk-247	Berkelium (97)	1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Bk-249		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Br-76	Bromine (35)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Br-77		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Br-82		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
C-11	Carbon (6)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
C-14		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Ca-41	Calcium (20)	$1.0 \times 10^5$	$2.7 \times 10^{-6}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Ca-45		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Ca-47		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Cd-109	Cadmium (48)	$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Cd-113m		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Cd-115		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Cd-115m		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Ce-139	Cerium (58)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Ce-141		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Ce-143		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Ce-144 (b)		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$

Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
Cf-248	Californium (98)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Cf-249		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^3$	$2.7 \times 10^{-8}$
Cf-250		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Cf-251		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^3$	$2.7 \times 10^{-8}$
Cf-252		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Cf-253		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Cf-254		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^3$	$2.7 \times 10^{-8}$
Cl-36	Chlorine (17)	$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Cl-38		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Cm-240	Curium (96)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Cm-241		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Cm-242		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Cm-243		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Cm-244		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Cm-245		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^3$	$2.7 \times 10^{-8}$
Cm-246		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^3$	$2.7 \times 10^{-8}$
Cm-247		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Cm-248		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^3$	$2.7 \times 10^{-8}$
Co-55	Cobalt (27)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$

Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
Co-56		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Co-57		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Co-58		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Co-58m		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Co-60		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Cr-51	Chromium (24)	$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Cs-129	Cesium (55)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Cs-131		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Cs-132		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Cs-134		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Cs-134m		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Cs-135		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Cs-136		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Cs-137 (b)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Cu-64	Copper (29)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Cu-67		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Dy-159	Dysprosium (66)	$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Dy-165		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Dy-166		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$

Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
Er-169	Erbium (68)	$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Er-171		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Eu-147	Europium (63)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Eu-148		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Eu-149		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Eu-150 (short lived)		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Eu-150 (long lived)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Eu-152		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Eu-152m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Eu-154		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Eu-155		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Eu-156		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
F-18	Fluorine (9)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Fe-52	Iron (26)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Fe-55		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Fe-59		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Fe-60		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Ga-67	Gallium (31)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Ga-68		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$

Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
Ga-72		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Gd-146	Gadolinium (64)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Gd-148		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Gd-153		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Gd-159		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Ge-68	Germanium (32)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Ge-71		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^8$	$2.7 \times 10^{-3}$
Ge-77		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Hf-172	Hafnium (72)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Hf-175		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Hf-181		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Hf-182		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Hg-194	Mercury (80)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Hg-195m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Hg-197		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Hg-197m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Hg-203		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Ho-166	Holmium (67)	$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Ho-166m		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$



Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
I-123	Iodine (53)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
I-124		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
I-125		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
I-126		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
I-129		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
I-131		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
I-132		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
I-133		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
I-134		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
I-135		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
In-111	Indium (49)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
In-113m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
In-114m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
In-115m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Ir-189	Iridium (77)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Ir-190		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Ir-192		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Ir-194		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
K-40	Potassium (19)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$

Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
K-42		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
K-43		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Kr-81	Krypton (36)	$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Kr-85		$1.0 \times 10^5$	$2.7 \times 10^{-6}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Kr-85m		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^{10}$	$2.7 \times 10^{-1}$
Kr-87		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^9$	$2.7 \times 10^{-2}$
La-137	Lanthanum (57)	$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
La-140		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Lu-172	Lutetium (71)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Lu-173		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Lu-174		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Lu-174m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Lu-177		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Mg-28	Magnesium (12)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Mn-52	Manganese (25)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Mn-53		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^9$	$2.7 \times 10^{-2}$
Mn-54		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Mn-56		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Mo-93	Molybdenum (42)	$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^8$	$2.7 \times 10^{-3}$

Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
Mo-99		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
N-13	Nitrogen (7)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^9$	$2.7 \times 10^{-2}$
Na-22	Sodium (11)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Na-24		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Nb-93m	Niobium (41)	$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Nb-94		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Nb-95		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Nb-97		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Nd-147	Neodymium (60)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Nd-149		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Ni-59	Nickel (28)	$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^8$	$2.7 \times 10^{-3}$
Ni-63		$1.0 \times 10^5$	$2.7 \times 10^{-6}$	$1.0 \times 10^8$	$2.7 \times 10^{-3}$
Ni-65		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Np-235	Neptunium (93)	$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Np-236 (short-lived)		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Np-236 (long-lived)		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Np-237 (b)		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^3$	$2.7 \times 10^{-8}$
Np-239		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Os-185	Osmium (76)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$

Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
Os-191		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Os-191m		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Os-193		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Os-194		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
P-32	Phosphorus (15)	$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
P-33		$1.0 \times 10^5$	$2.7 \times 10^{-6}$	$1.0 \times 10^8$	$2.7 \times 10^{-3}$
Pa-230	Protactinium (91)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Pa-231		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^3$	$2.7 \times 10^{-8}$
Pa-233		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Pb-201	Lead (82)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Pb-202		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Pb-203		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Pb-205		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Pb-210 (b)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Pb-212 (b)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Pd-103	Palladium (46)	$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^8$	$2.7 \times 10^{-3}$
Pd-107		$1.0 \times 10^5$	$2.7 \times 10^{-6}$	$1.0 \times 10^8$	$2.7 \times 10^{-3}$
Pd-109		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Pm-143	Promethium (61)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$

Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
Pm-144		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Pm-145		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Pm-147		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Pm-148m		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Pm-149		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Pm-151		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Po-210	Polonium (84)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Pr-142	Praseodymium (59)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Pr-143		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Pt-188	Platinum (78)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Pt-191		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Pt-193		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Pt-193m		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Pt-195m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Pt-197		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Pt-197m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Pu-236	Plutonium (94)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Pu-237		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Pu-238		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$

Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
Pu-239		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Pu-240		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^3$	$2.7 \times 10^{-8}$
Pu-241		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Pu-242		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Pu-244		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Ra-223 (b)	Radium (88)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Ra-224 (b)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Ra-225		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Ra-226 (b)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Ra-228 (b)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Rb-81	Rubidium (37)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Rb-83		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Rb-84		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Rb-86		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Rb-87		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Rb(nat)		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Re-184	Rhenium (75)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Re-184m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Re-186		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$

Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
Re-187		$1.0 \times 10^6$	$2.7 \times 10^{-5}$	$1.0 \times 10^9$	$2.7 \times 10^{-2}$
Re-188		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Re-189		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Re(nat)		$1.0 \times 10^6$	$2.7 \times 10^{-5}$	$1.0 \times 10^9$	$2.7 \times 10^{-2}$
Rh-99	Rhodium (45)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Rh-101		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Rh-102		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Rh-102m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Rh-103m		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^8$	$2.7 \times 10^{-3}$
Rh-105		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Rn-222 (b)	Radon (86)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^8$	$2.7 \times 10^{-3}$
Ru-97	Ruthenium (44)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Ru-103		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Ru-105		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Ru-106 (b)		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
S-35	Sulfur (16)	$1.0 \times 10^5$	$2.7 \times 10^{-6}$	$1.0 \times 10^8$	$2.7 \times 10^{-3}$
Sb-122	Antimony (51)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Sb-124		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Sb-125		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$

Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
Sb-126		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Sc-44	Scandium (21)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Sc-46		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Sc-47		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Sc-48		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Se-75	Selenium (34)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Se-79		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Si-31	Silicon (14)	$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Si-32		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Sm-145	Samarium (62)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Sm-147		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Sm-151		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^8$	$2.7 \times 10^{-3}$
Sm-153		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Sn-113	Tin (50)	$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Sn-117m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Sn-119m		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Sn-121m		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Sn-123		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Sn-125		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$



Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
Sn-126		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Sr-82	Strontium (38)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Sr-85		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Sr-85m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Sr-87m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Sr-89		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Sr-90 (b)		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Sr-91		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Sr-92		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
T(H-3)		$1.0 \times 10^6$	$2.7 \times 10^{-5}$	$1.0 \times 10^9$	$2.7 \times 10^{-2}$
Ta-178 (long-lived)	Tantalum (73)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Ta-179		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Ta-182		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Tb-157	Terbium (65)	$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Tb-158		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Tb-160		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Tc-95m	Technetium (43)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Tc-96		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Tc-96m		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$

Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
Tc-97		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^8$	$2.7 \times 10^{-3}$
Tc-97m		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Tc-98		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Tc-99		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Tc-99m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Te-121	Tellurium (52)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Te-121m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Te-123m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Te-125m		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Te-127		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Te-127m		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Te-129		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Te-129m		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Te-131m		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Te-132		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Th-227	Thorium (90)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Th-228 (b)		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Th-229 (b)		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^3$	$2.7 \times 10^{-8}$
Th-230		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$

Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
Th-231		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Th-232		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Th-234 (b)		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Th (nat) (b)		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^3$	$2.7 \times 10^{-8}$
Ti-44	Titanium (22)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Tl-200	Thallium (81)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Tl-201		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Tl-202		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Tl-204		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Tm-167	Thulium (69)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Tm-170		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Tm-171		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^8$	$2.7 \times 10^{-3}$
U-230 (fast lung absorption) (b),(d)	Uranium (92)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
U-230 (medium lung absorption) (e)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
U-230 (slow lung absorption) (f)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
U-232 (fast lung absorption) (b),(d)		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^3$	$2.7 \times 10^{-8}$

Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
U-232 (medium lung absorption) (e)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
U-232 (slow lung absorption) (f)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
U-233 (fast lung absorption) (d)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
U-233 (medium lung absorption) (e)		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
U-233 (slow lung absorption) (f)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
U-234 (fast lung absorption) (d)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
U-234 (medium lung absorption) (e)		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
U-234 (slow lung absorption) (f)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
U-235 (all lung absorption types) (b),(d),(e),(f)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
U-236 (fast lung absorption) (d)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
U-236 (medium lung absorption) (e)		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$

Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
U-236 (slow lung absorption) (f)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
U-238 (all lung types) (b),(d),(e),(f)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
U (nat) (b)		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^3$	$2.7 \times 10^{-8}$
U (enriched to 20% or less) (g)		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^3$	$2.7 \times 10^{-8}$
U (dep)		1.0	$2.7 \times 10^{-11}$	$1.0 \times 10^3$	$2.7 \times 10^{-8}$
V-48	Vanadium (23)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
V-49		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
W-178	Tungsten (74)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
W-181		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
W-185		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
W-187		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
W-188		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Xe-122	Xenon (54)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^9$	$2.7 \times 10^{-2}$
Xe-123		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^9$	$2.7 \times 10^{-2}$
Xe-127		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Xe-131m		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$

Figure: 25 TAC §289.257(ee)(7)

Symbol of radionuclide	Element and atomic number	Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limit for exempt consignment (Bq)	Activity limit for exempt consignment (Ci)
Xe-133		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^4$	$2.7 \times 10^{-7}$
Xe-135		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^{10}$	$2.7 \times 10^{-1}$
Y-87	Yttrium (39)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Y-88		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Y-90		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Y-91		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Y-91m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Y-92		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Y-93		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$
Yb-169	Ytterbium (70)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Yb-175		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Zn-65	Zinc (30)	$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Zn-69		$1.0 \times 10^4$	$2.7 \times 10^{-7}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Zn-69m		$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Zr-88	Zirconium (40)	$1.0 \times 10^2$	$2.7 \times 10^{-9}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Zr-93 (b)		$1.0 \times 10^3$	$2.7 \times 10^{-8}$	$1.0 \times 10^7$	$2.7 \times 10^{-4}$
Zr-95		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^6$	$2.7 \times 10^{-5}$
Zr-97 (b)		$1.0 \times 10^1$	$2.7 \times 10^{-10}$	$1.0 \times 10^5$	$2.7 \times 10^{-6}$

Figure: 25 TAC §289.257(ee)(7)

<sup>a</sup>[Reserved]

<sup>b</sup> Parent nuclides and their progeny included in secular equilibrium are listed in the following:

Sr-90	Y-90
Zr-93	Nb-93m
Zr-97	Nb-97
Ru-106	Rh-106
Cs-137	Ba-137m
Ce-134	La-134
Ce-144	Pr-144
Ba-140	La-140
Bi-212	Tl-208 (0.36), Po-212 (0.64)
Pb-210	Bi-210, Po-210
Pb-212	Bi-212, Tl-208 (0.36), Po-212 (0.64)
Rn-220	Po-216
Rn-222	Po-218, Pb-214, Bi-214, Po-214
Ra-223	Rn-219, Po-215, Pb-211, Bi-211, Tl-207
Ra-224	Rn-220, Po-216, Pb-212, Bi-212, Tl-208(0.36), Po-212 (0.64)
Ra-226	Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210
Ra-228	Ac-228
Th-226	Ra-222, Rn-218, Po-214
Th-228	Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)
Th-229	Ra-225, Ac-225, Fr-221, At-217, Bi-213, Po-213, Pb-20
Th-nat	Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 0.36), Po-212 (0.64)
Th-234	Pa-234m
U-230	Th-226, Ra-222, Rn-218, Po-214
U-232	Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)
U-235	Th-231
U-238	Th-234, Pa-234m
U-nat	Th-234, Pa-234m, U-234, Th-230, Ra-226, Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210
U-240	Np-240m
Np-237	Pa-233
Am-242m	Am-242

Figure: 25 TAC §289.257(ee)(7)

Am-243      Np-239

<sup>c</sup>[Reserved]

<sup>d</sup> These values apply only to compounds of uranium that take the chemical form of  $\text{UF}_6$ ,  $\text{UO}_2\text{F}_2$  and  $\text{UO}_2(\text{NO}_3)_2$  in both normal and accident conditions of transport.

<sup>e</sup> These values apply only to compounds of uranium that take the chemical form of  $\text{UO}_3$ ,  $\text{UF}_4$ ,  $\text{UCl}_4$  and hexavalent compounds in both normal and accident conditions of transport.

<sup>f</sup> These values apply to all compounds of uranium other than those specified in notes (d) and (e) of this table.

<sup>g</sup> These values apply to unirradiated uranium only.



Figure: 25 TAC §289.257(ee)(8)

Table 257-5: General Values For A<sub>1</sub> And A<sub>2</sub>

Contents	A <sub>1</sub>		A <sub>2</sub>		Activity concentration for exempt material (Bq/g)	Activity concentration for exempt material (Ci/g)	Activity limits for exempt consignments (Bq)	Activity limits for exempt consignments (Ci)
	(TBq)	(Ci)	(TBq)	(Ci)				
Only beta or gamma emitting radionuclides are known to be present	$1 \times 10^{-1}$	$2.7 \times 10^0$	$2 \times 10^{-2}$	$5.4 \times 10^{-1}$	$1 \times 10^1$	$2.7 \times 10^{-10}$	$1 \times 10^4$	$2.7 \times 10^{-7}$
Only alpha emitting radionuclides are known to be present	$2 \times 10^{-1}$	$5.4 \times 10^0$	$9 \times 10^{-5}$	$2.4 \times 10^{-3}$	$1 \times 10^{-1}$	$2.7 \times 10^{-12}$	$1 \times 10^3$	$2.7 \times 10^{-8}$
No relevant data are available	$1 \times 10^{-3}$	$2.7 \times 10^{-2}$	$9 \times 10^{-5}$	$2.4 \times 10^{-3}$	$1 \times 10^{-1}$	$2.7 \times 10^{-12}$	$1 \times 10^3$	$2.7 \times 10^{-8}$

Table 257-6: Activity-mass Relationships for Uranium

Uranium Enrichment* wt % U-235 present	Specific Activity TBq/g	Specific Activity Ci/g
0.45	$1.8 \times 10^{-8}$	$5.0 \times 10^{-7}$
0.72	$2.6 \times 10^{-8}$	$7.1 \times 10^{-7}$
1.0	$2.8 \times 10^{-8}$	$7.6 \times 10^{-7}$
1.5	$3.7 \times 10^{-8}$	$1.0 \times 10^{-6}$
5.0	$1.0 \times 10^{-7}$	$2.7 \times 10^{-6}$
10.0	$1.8 \times 10^{-7}$	$4.8 \times 10^{-6}$
20.0	$3.7 \times 10^{-7}$	$1.0 \times 10^{-5}$
35.0	$7.4 \times 10^{-7}$	$2.0 \times 10^{-5}$
50.0	$9.3 \times 10^{-7}$	$2.5 \times 10^{-5}$
90.0	$2.2 \times 10^{-6}$	$5.8 \times 10^{-5}$
93.0	$2.6 \times 10^{-6}$	$7.0 \times 10^{-5}$
95.0	$3.4 \times 10^{-6}$	$9.1 \times 10^{-5}$

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\* The figures for uranium include representative values for the activity of the uranium-235 which is concentrated during the enrichment process.